TECHNOLOGY DEPARTMENT

The CHEMICAL AGE

VOL LIX 11 SEPTEMBER 1948 No 1522

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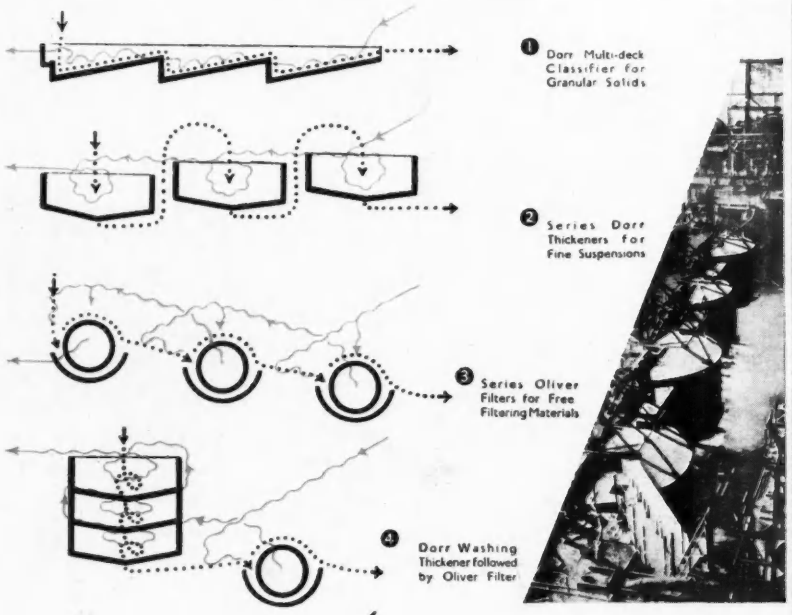
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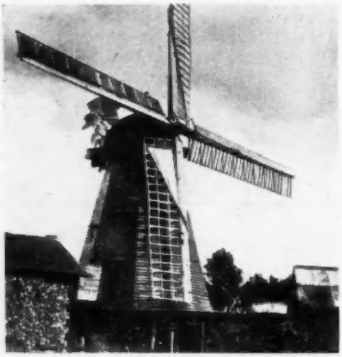

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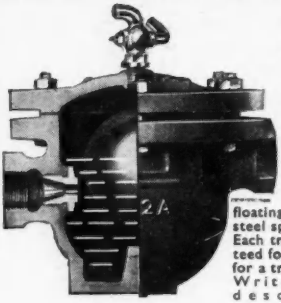

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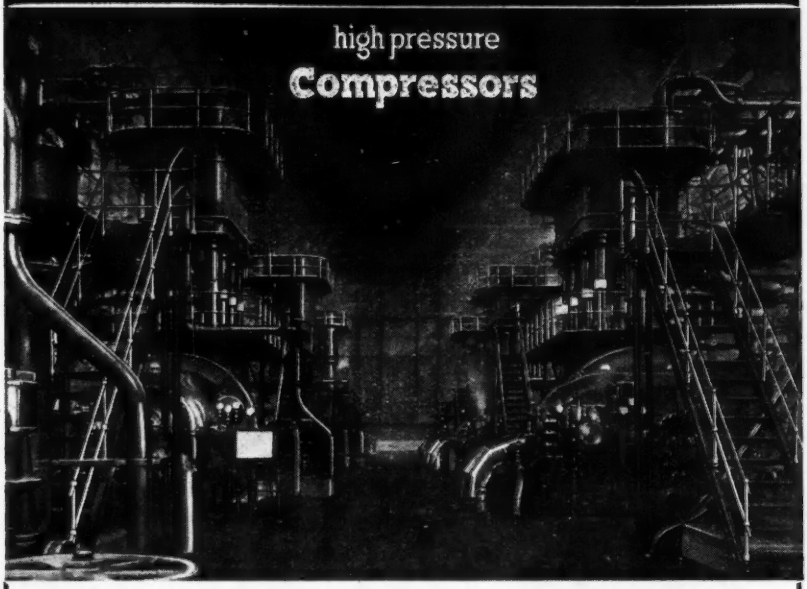

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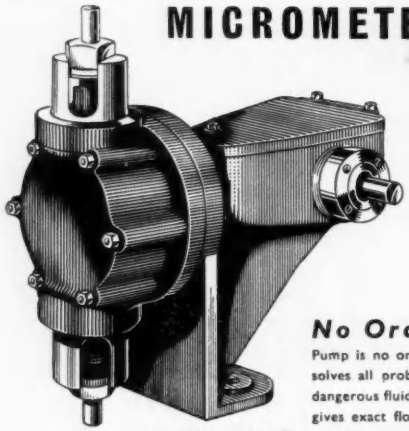

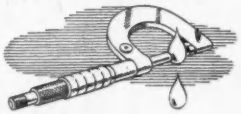

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INDEX TO ADVERTISERS
IN THIS ISSUE

	Page
Allen, Edgar, & Co., Ltd.	Cover ii
Auto Klean Strainers, Ltd.	xii
Automatic Coil Winder & Electrical Equipment Co., Ltd., The	v
Balfour, Henry & Co., Ltd.	xv
Bamag, Ltd.	369
Blackwell's Metallurgical Works, Ltd.	xxii
Boots Pure Drug Co., Ltd.	xii
British Gas Council, The	viii
Brotherhood, Peter, Ltd.	i
Brough, E. A., & Co., Ltd.	xvii
Classified Advertisements	xviii, xix, xx & xxi
Cruickshank, R., Ltd.	Cover ii
Danks of Netherton, Ltd.	Cover iii
Dorr-Oliver & Co., Ltd.	Front Cover
Dunlop Special Products, Ltd.	xi
E.C.D., Ltd.	ii
Electro-Power Service Co., The	xxii
Fielding, T. H., & Sons, Ltd.	xxii
Foyle, W., & G., Ltd.	xxii
Geigy, Ltd.,	xiv
Girling, S., & Sons (Coopers), Ltd.	xxii
Hardy, M. W., & Co., Ltd.	ix
Harris, Francis W., & Co., Ltd.	iv
Haughton's Metallic Co., Ltd.	xxii
International Pulverisers, Ltd.	Cover iii
Jobling, James A., & Co., Ltd.	ix & xiii
Kestner Evaporator & Engineering Co., Ltd.	xvi & xxi
Key Engineering Co., Ltd., The	Cover ii
Laboratory Suppliers, Ltd.	xxi
Laporte Chemicals, Ltd.	iv
Leigh & Sons Metal Works	xxii
Leitch, John W., & Co., Ltd.	vii
Lennox Foundry Co., Ltd.	xxii
Metafiltration Co., Ltd., The	iii
Metropolitan-Vickers Electrical Co., Ltd.	Cover iv
Mirrlees Watson Co., Ltd., The	xiii
Mitchell, L. A., Ltd.	Cover iv
National Enamels, Ltd.	vi
Organic Dyestuffs, Ltd.	Cover iii
Orr, Geo. W., & Co., Ltd.	x
Perry & Hope, Ltd.	370
Podmore, W., & Sons, Ltd.	vi
Reeve-Angel, H., & Co., Ltd.	vi
Remington Rand, Ltd.	xi
Robinson Brothers, Ltd.	x
Robinson, L., & Co.	xiv
Simon, Richard, & Sons, Ltd.	vii
Somerville & Morrison, Ltd.	viii
Spence, Peter & Sons, Ltd.	ii
Steel, J. M., & Co., Ltd.	xvii
Steele & Cowlishaw, Ltd.	x
Swift & Co., Pty., Ltd.	x
T. & T. Works, Ltd.	Cover iii
Tretol, Ltd.	vi
Wilkinson, James, & Son, Ltd.	xvi

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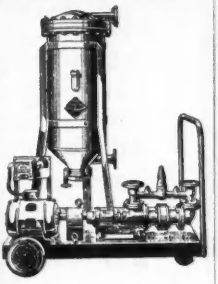

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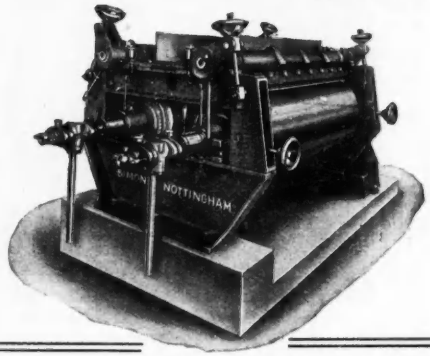

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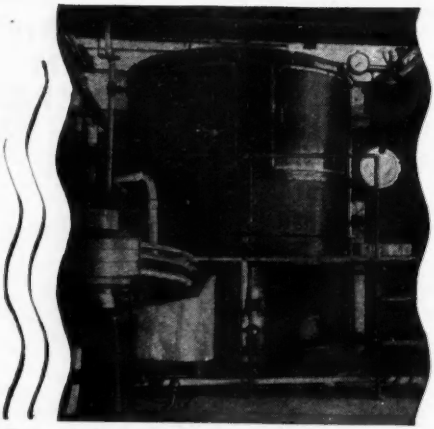

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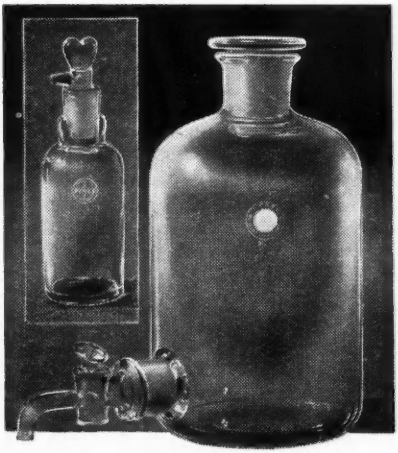

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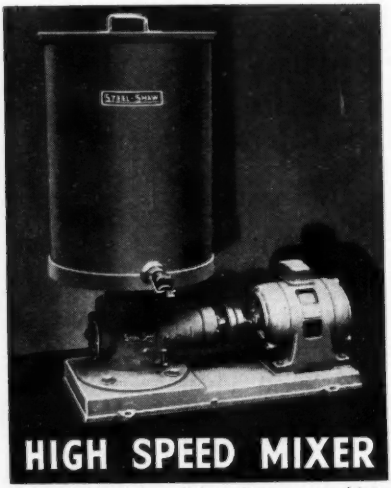

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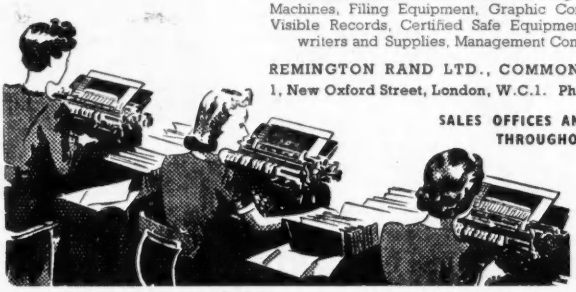

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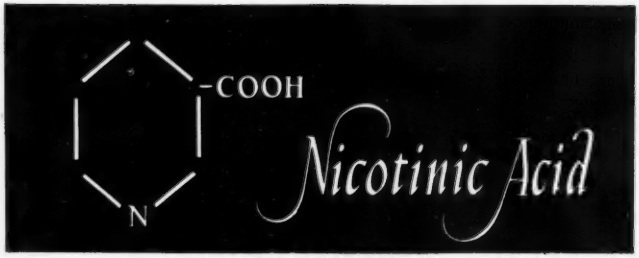

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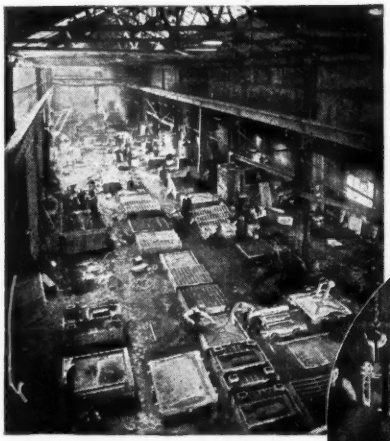

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"The Passing World"

SIR HENRY TIZARD has entitled his presidential address to the British Association "The Passing World," and in it he has reviewed the achievements of mankind in his own lifetime. Naturally, he has not been content with a survey, but has reflected on what policy should be followed for the future. His advice may be summarised in the words of Carlyle: "Our main business is not to see what lies dimly at a distance, but to do what lies clearly at hand." There is stimulation in his conclusion: "We live, indeed, in difficult times. But they are very interesting times; and difficulties are bracing to a nation which has not lost the resilience of youth. . . . This is a time for adventure; for taking risks. Calculated risks, of course; but not so nicely or lengthily calculated that they are taken too late." and he ends by predicting that when many years hence a future president of the British Association "reviews the progress of the nation from the depths of bankruptcy to new and unsurpassed heights of prosperity and influence . . . he may justly claim that the chief cause of the change was that we had found the right way to combine originality in science with enterprise and speed in its application."

Looking forward with calculated optimism must not blind us to the present difficulties. Sir Henry faces those difficulties and considers how they should be met. It is perhaps not without significance that he is chairman of the Advisory Council on Scientific Policy, the first report of which we have discussed previously in its association with Government Scientific Policy. The presidential address to the British Association bears evidence of coming out of the same stable, though in many respects it discusses matters with which that report could not deal.

The events of the past have served to quicken the national interest in science. That is common knowledge. Sir Henry recalls the shock caused by the exposure of our industrial short-comings during the first World War, which had been concealed by the apparent prosperity of previous years, and which led to events which must surely find a place in the history-books of the future; as a result, after that war ". . . there was a surge of discovery which put Great Britain in the van of progress in nearly all branches of science. We became a scientific nation. . . The chemical industries took on a new and active lease of life." In spite of this, we have failed to keep our place among the great industrial nations of the world. Why?

The reason, in Sir Henry's view does not lie in failure to carry out sufficient research. His conclusion is that reached also in the Advisory Council's report, namely, that what is lacking is the application of existing knowledge. The productivity of labour is far lower than it could be if "the results of past research were more resolutely and continuously applied."

There are two conditions for future

On Other Pages

Leader:
"The Passing World" ... 337
Notes and Comments:
Taxation and Industry 339
Nothing in the Bag 339
Copenhagen Exhibition ... 339
Oil and Chemicals 340
American Model 340
The Paper Censorship 340
Prospects in Copenhagen 341
Electronic Instruments 341
Chemical Safety Conference ... 342
Smoke Abatement 342
Arresting River Pollution 342
Alleged Factory Nuisances 342
Chemical Industry in China ... 343
New U.S. Wattmeter 344
Alsace Potassium Mining 344
U.K. Chemical Plant in Spain ... 345
Barometer of Chemical Industry ... 346
Diatomite from Skye 347
High Strength Hydrogen Peroxide ... 351
A. Boake Roberts in South Africa 353
New U.S. Chemical Plants 353
J. A. R. Newlands (1837-1898) ... 354
Another Aluminium Alloy 356
Industrial Brazil 356
Substitute Sources of Cresylic Acid 357
Scottish Plan to Recruit Technicians 357
Chemicals from Seawater 359
Leather Trades Chemists 359
Synthetic Mica Threatens Indian Industry 360
A Chemist's Bookshelf 361
Technical Publications 363
Efficient Water Treatment 364

success here, and we shall do well to note them both. One is that the nation as a whole shall attain a higher standard in technology—that largely resolves itself into technical education. The other is that the captains and non-commissioned officers of industry, *from the board room downwards*, shall be technically trained.

The British industries that are now standing up best to the strain of adverse conditions, in Sir Henry's view, are those that most nearly approach this system. "The chemical industries, for example, have gradually developed a similar organisation over the last 30 years. Neither research nor development is neglected, and management is in the hands of men highly educated in pure and applied science. . . . Forty years ago they were inferior to the German industries, now they have little to fear from any competitors." The steel industry has developed along the same lines, and its contemporary achievements, to the chagrin of those who would nationalise it, are second to none. Moreover, Sir Henry asks us to note that "in such industries human troubles, if not entirely absent, are inconspicuous."

This problem of productivity and of the management of industrial undertakings is our most immediate care, but beyond that other problems loom. There was apparent over-production of food in the 1930's. "Since then," Sir Henry has reminded us, "the population of the world has increased by some 300 million people." He believes that we could increase agricultural production in this country by 20 per cent through the application of known methods, but even so we should still have to import food for 20-25 million people. Meanwhile 20-odd millions are being added each year to the world's population. "Whatever other countries may do, it is our bounden duty, and the only certain method of safeguarding our future so long as we remain a large food importing country, to develop our Colonial territories, particularly the under-populated African Colonies, where the increase in population that would follow the control of disease and the increase of food supply would open fresh markets for international trade." This great task will call for the intensive application of science, in collaboration with other countries."

We live, in difficult times indeed, but as Sir Henry implies, they convey a challenge. The crowding problems, despite all political talk, are basically problems of the application of science—not only of chemistry or physics—but of all the productive and ameliorative sciences. We shall do well to ponder deeply the advice of scientists whose experience of affairs is as wide as that of the 1948 president of the British Association.

NOTES AND COMMENTS

Taxation and Industry

THERE is no doubt that present heavy taxes are slowing down our industrial progress at a time when it should be forging ahead with all possible speed. Many are the complaints directed against the Chancellor of the Exchequer on the subject, but not all are supported by a clear account of the way in which taxation is applying the brakes to industrial expansion and improvement. Such a picture was painted by Mr. Roger Duncalfe, chairman of British Glues & Chemicals, Ltd., in his review at the recent annual general meeting of the company. Industrial progress, he said, demanded the ploughing back of substantial profits in order to finance expanding trade, and to maintain and improve buildings, plant and tools. But under the present remorseless taxation, the build-up of capital within the business was moving too slowly to achieve the speedy resurgence of industry along modern lines. Mr. Duncalfe quoted figures showing that out of every £1 received in the group as trading income, 18s. 6½d. is spent on raw materials, wages, plant maintenance and other production costs, and that of the remaining 1s. 5½d. in the £, 10½d. is absorbed in taxation, 3¾d. is retained in the business as additional capital, leaving only 3½d. for the stockholders as dividend. Mr. Duncalfe's figures surely explode the myth about the supposedly " colossal " amount that goes into shareholders' pockets and indicate that speedier expansion of industry is dependent upon an easing of taxation.

Nothing in the Bag

ECONOMIC pressure has been responsible for some strange partnerships, but none, perhaps, more unexpected than the community of viewpoint between Mr. Duncalfe and the Chancellor of the Exchequer, evidenced by some of the unpalatable facts which Sir Stafford Cripps has been imparting this week to the annual meeting of the TUC. It must have needed all his undoubted courage to tear to shreds the legend—which his party has spent years in disseminating—that you can get all your heart desires by the simple expedient of " soaking the rich." According to Sir Stafford that particular Father Christmas now carries a sack too small to satisfy a village choir outing, let alone the requirements of some eight million organised trade unionists. Sir Stafford, having plundered that sack most purposefully himself, should know how little is still in it. " We have only to look at the figures of distributed corporation profits and compare them with the amount spent on wages and salaries to know there is no substantial relief to be obtained from that source," he told the TUC. And, to prove there was no deception, he gave them some "rough estimates" of how earnings were distributed in 1947 : dividends (after tax) £320 million; wages, on the same basis, £3260 million; salaries, £1435 million.

Copenhagen Exhibition

SPEAKING at a Press conference in London this week, Sir Guy Locock, C.M.G., vice-president of the Federation of British Industries, referred to the unique character of the forthcoming British Exhibition in Copenhagen in that it really owed its inception to the Danes themselves. It was, he said, being organised by the British Import Union of Copenhagen in co-operation with the FBI and with the approval of H.M. Government and the Danish Government, and was a gesture of great friendliness towards this country on the part of the Danish people. They had taken the initiative in organising an exhibition, which was really chiefly in the interests of Britain. Although the main purpose of the exhibition was the selling of British goods in Denmark, said Sir Guy Locock, the fact must not be lost sight of that if we want to sell to Denmark we shall have to buy from her, and it was his hope that the exhibition would be the means of instigating a two-way trade. Our own view is that this enterprise deserves all the success that wholehearted co-operation can assure, and it is to be regretted that those responsible for the dissemination of the advance information here have not, as yet, furnished the technical, scientific and trade Press with the sort of information which technicians and scientists require. One hopes,

however, that this omission may still be rectified in time for the Press to do justice to the description of the exhibits of the thousand-odd British manufacturing firms showing at Copenhagen, whose goods, it may be safely assumed, will be truly representative of the technology and fine workmanship for which this country is famed.

Oil and Chemicals

IN their preoccupation with coal, steel, textiles and some other industries conspiculously in the public eye, recent contributors to the lively politico-cum-industrial " symposium " on the prospects of enhanced production in the United Kingdom have preserved silence with regard to one of the youngest and certainly not the least promising of our industries—oil refining. That perhaps is not entirely their fault, having regard to the general paucity of information about what has been achieved in the actual refinery processing and the even more promising offspring in the chemical field, the potentialities of which are already being evidenced by the increasing availability of some synthetic detergents, wetting agents and similar products. These, however, most certainly do not mark the limits of what can be done when home refining on a large scale is linked with chemical producing plants, and it is tempting to anticipate some of the solid benefits which could accrue when the field is fully developed. Had the technique of petroleum-chemical production been available when the first large-scale British refinery took shape at Llandarcy nearly 30 years ago the history of that project would almost certainly have been very different.

American Model

THERE seems to be very little doubt that economically the conversion of petroleum into higher valued products will ultimately be one of the more important factors in rendering profitable the refining of crude in plants situated some thousands of miles from the nearest sizeable natural source. It is no bad thing that the U.S.A. is simultaneously becoming almost feverishly interested in this and affiliated branches of research (under much more favourable conditions) which it is carrying out on a typically lavish scale without too much reticence about what it has achieved. Practical experience there has provided many useful pointers, of which the latest was the description to the American Chemical Society in Washington, D.C., of the successful adaptation by the Standard Oil Development Company of the " hybrid " Oxo pricess to pilot and commercial plant production of higher primary alcohols from petroleum olefins. These appear to be yelding an important and fruitful source of plasticisers essential for the fuller development of vinyl resins and synthetic rubber. Laboratory and commercial evidence is being adduced that these alcohols are effective competitors of phthalate and other types of ester plasticisers. While synthetic rubber production is of relatively small interest here, present indications of other prospective uses, such as paint dryers, wetting agent intermediates and anti-foaming agents, suggest that this could well be another ramification of the growing British petroleum industry.

The Paper Censorship

HOW seriously the shortage of paper is effecting the supply of textbooks for students was the subject of timely comment in the *Manchester Guardian* recently. It is impossible for the student to-day to obtain, on the average, more than about half the new books required, and extremely difficult to augment these from the second-hand market. English publishers, handicapped by shortage of paper and forced to export about a quarter of their output, are consequently being overwhelmed by American publications. This journal receives from American sources more technical books for review and notifications of others in preparation or available than from all the English publishers together. Many of these products from the U.S.A. are excellent, but surely something might be done to enable our own specialist writers and publishers to compete with this invasion on equal terms. As technical and scientific books are given a priority when imported, it would not seem unreasonable to suggest that such publications should receive a very much more generous treatment when paper supplies are allocated.

Prospects in Copenhagen

More than 1000 British Displays

FURTHER facts about the British Exhibition in Copenhagen (September 18 to October 3) were furnished at a Press conference in London this week, which was addressed by Sir Guy Locock, C.M.G., vice-president of the Federation of British Industries. With more than a thousand British manufacturers represented there, the exhibition, it was stated, would be the largest and most comprehensive display of British goods ever held in Denmark or Scandinavia, and the first all-British exhibition to be held anywhere overseas since the end of the war. The opening ceremony, by the King of Denmark, in the presence of the Duke and Duchess of Gloucester, will also be witnessed by the Rt. Hon. Harold Wilson, M.P., President of the Board of Trade.

The exhibition area will approach 200,000 sq. ft. It is the third all-British exhibition to be held in Copenhagen. The first was in 1931 and the second in 1932, when the total area under cover was 65,000 sq. ft. Sir Guy Locock pointed out that in many cases the exhibiting firms will be displaying products which have never before been shown in Denmark, or in any other country abroad, for that matter. Judging by the number of British firms exhibiting, he said, they were apparently in no doubt about the good results likely to accrue from the enterprise at Copenhagen. In addition to their friends the Danes, they were expecting also an influx of buyers from Scandinavia and from many other countries.

Electronic Instruments

Trade Exhibition in Birmingham

SO successful was a trade exhibition of electronic instruments held recently in London that it has been arranged to hold a similar show in Birmingham. A new range of instruments for use in industry and research will be on display at the Grand Hotel, Birmingham, from September 20 to 24 inclusive. The exhibition will be open from 10 a.m. to 6 p.m. daily, and admission, which is free, will be limited to ticket holders only. Further information and tickets will be supplied to the trade only on application to Cinema-Television Limited, Worsley Bridge Road, Lower Sydenham, London, S.E.26.

One of the most interesting exhibits will be the industrial electronic metal detector for detecting " tramp " metal in raw material and in manufactured goods before they leave the factories.

An electronic counter will be shown, which, counting at speeds of up to 30,000 per minute, can record the output of machines, or can be used in research work to count radiation particles. Another type of counter also shown is the decimal counter chronometer, which will measure short time intervals of up to one second in duration with an accuracy of plus or minus 10 microseconds.

Three new oscilloscopes will be demonstrated; the laboratory oscilloscope, for general work; the demonstration oscilloscope, including a 15-in. cathode ray tube; and the universal oscilloscope, of unit construction and designed to cover the widest variety of applications.

The main block of the Forum building in which will be displayed during the Copenhagen Exhibition, a representative variety of British industrial chemicals, some of which have not previously been shown publicly outside this country

Photo: Jonals Co., Copenhagen

Chemical Safety Conference

ABCM Programme for October

THE Association of British Chemical Manufacturers has invited the Royal Society for the Prevention of Accidents to organise on its behalf a chemical works safety conference, which will take place at the Grand Hotel, Harrogate, on October 29 to 31, 1948. The opening address will be given on Friday, October 29, by Sir Ewart Smith, of Imperial Chemical Industries, Ltd., and the programme will include the following lectures: "Health Hazards—Present and Future," by J. Gwynne Morgan, of the Mond Nickel Co., Ltd.; "Safety in Chemical Plant Design," by J. E. Braham, I.C.I., Ltd., "Safety Organisation," by H. R. Payne, chairman, Works Safety Committee, ABCM; "Safety Records," by H. G. Winbolt, Director, Industrial Safety Division, Royal Society for the Prevention of Accidents; "Clearance Certificates," by A. G. Palmer, of the Gas Light and Coke Co. These papers will be followed by a "two-way brains trust" on which questions relating to chemical works safety will be answered.

The chairman for the opening address will be Sir Harold West, of Newton Chambers & Co., Ltd., and the chairman for the working sessions will be Mr. J. Davidson Pratt, director and secretary of the ABCM.

SMOKE ABATEMENT

THE attendance of the Minister of Fuel and Power, Mr. Hugh Gaitskell, at the annual conference of the National Smoke Abatement Society at Cheltenham, September 30 to October 1, will emphasise the growing alliance between the movement for smoke prevention and the national drive for fuel efficiency. Some 400 delegates from local authorities, Government departments, fuel and other technical organisations, as well as individual members, will be present.

A preliminary report will be given of a survey of the sources and incidence of atmospheric pollution conducted by the society by means of questionnaires to 1800 local authorities. The programme also includes a series of contributed "Progress Reports" on work of special interest being done by local authorities and other bodies.

At other sessions will be papers on "Smoke Prevention in Relation to Town Planning," by J. Nelson Meredith, city architect for Bristol, and "Smoke Abolition and the Public: Problems of Education and Propaganda," by Leslie Hardern.

Arresting River Pollution

Petition to the King

A PETITION has been framed and is now in the hands of the Secretary of State for Scotland for presentation to the King, appealing for action to prevent the further pollution of rivers in Scotland by either industrial effluent or sewage. This campaign, sponsored by Lieut.-Col. R. A. B. Hamilton, of Wishaw, has the support of the Scottish Anglers' Association, representative body of the various local angling clubs. The petition complements earlier efforts to minimise the spoliation of rivers by trade or public effluents.

The petition declares: "The increasing addition of objectionable effluent such as sewage matter from both private and public housing schemes . . . . poisonous, noxious or polluting fluid from factories or manufacturing processes carried on in riparian premises have unfitted many of the rivers of Scotland for any of the primary uses. . . . That administrative action by the authorities charged with the power and duty of enforcing the legislative remedies provided against these clamant ills has in very large measure been abortive and has failed to suppress the mischief."

ALLEGED FACTORY NUISANCE

A BREAKDOWN in the water supply of the washing tower at the works of Fisons, Ltd., Widnes, was given as the reason for an emission of a fine white powder which was alleged to have caused a nuisance in the Bridge Street and Dock Street area of Widnes, one day recently. This information was given at a meeting of the Widnes Town Council, when it was reported that work on the plant was immediately stopped upon the discovery of the nuisance, and repairs put in hand at once. A partial analysis of a sample of the white powder revealed that it contained 50 parts per million arsenic; .06 per cent lead; and .2 per cent copper. The dust also contained a high percentage of fertilising material. The deputy City Analyst gave the opinion that the metal contents of the dust were not abnormally high, neither was the arsenic content, although he was unable to say definitely how harmful the latter would be.

At the same meeting of the Widnes Town Council, it was reported that gases had been emitted from the factory of Albright & Wilson, Ltd. The firm had expressed regret for the nuisance caused, which had been the result of an accident at the plant. Immediate steps had been taken by the management to prevent such faults in the future.

CHEMICAL INDUSTRY IN CHINA

Slow But Steady Post-War Progress

TORN by 10 years of war, followed by civil strife in various parts of the country, resulting in the dispersal and destruction of industry and rapid currency inflation, China faces the long road back to economic recovery beset by grave difficulties.

In a survey of current economic conditions in the country, based upon reports from commercial and consular attaches, the U.S. Office of International Trade has produced a wealth of significant data regarding the present position of China's chemical industry.

The report states that, while the war years took inevitable toll of important production facilites, the industry is making significant progress towards reconstruction, but more foreign capital, technical assistance and raw materials are required to speed up recovery and accelerate output.

Post-War Activity

During hostilities in 1937/8, more than 75 per cent of China's chemical producing and consuming units were destroyed and it was not until 1947 that the chemical industry, under the five-year reconstruction plan, was allotted $2 million for recovery purposes.

Following reorganisation of the Ministry of Economic Affairs in 1947, the National Resources Commission (originally established in 1935 to develop China's basic and important industries), was set up as a separate agency. By February this year it had 13 subsidiary chemical factories, 9 entirely owned and 4 partly owned, and significant increases in production were attained.

In 1947, the Commission manufactured 48 essential products and the output of 36 of these was greater than in 1946. Plants controlled by the Commission in 1947 were responsible for more than 30 per cent of the output of industrial acids and over 20 per cent of the alcohol production. Output was greater in those plants making sulphuric acid, fertilisers, sulphides and coke.

Nine alcohol plants were established during the war. The commission's Kunming Chemical Works in Yunnan made soda ash, caustic soda, sodium sulphide, and allied products, using locally obtained sodium sulphate. In addition, the NRC owns a low-temperature coal-distillation plant in Szechwan, where large quantities of bituminous coal are found.

An important development is the oil-cracking plant in Chungking where tung oil is treated to obtain gasoline substitutes and diesel oils. This is the first plant of its kind to be established in China.

Tung oil remains, however, a principal export and last year some 75,000 long tons were exported from Shanghai and Hong Kong. To increase output, more than 300,000 trees are to be planted in various districts.

Diminished Markets

On the other hand, diminishing export markets and the necessity to grow more foodstuffs, have seriously affected the output of menthol. In 1940 factories in Shanghai produced 1.5 million lb. of menthol and 850,000 lb. of mentholised peppermint oil. Last year only two out of twenty mills were in operation.

On a regional basis, Shanghai is industrially the most important city, and of the 200 chemical plants in operation in the area before the war 77 were active in early 1947. An estimated 60 to 80 per cent of the post-war consumption of fine and industrial chemicals is produced in the Shanghai district, and this situation is expected to continue for some time, because of unsettled conditions and transportation problems in the north. Shanghai has 76 chemical raw materials plants, 91 pharmaceutical factories, and more than 1400 plants consuming chemical products. Most of these have had to operate in a part-time basis because of the shortage of materials.

Hostilities dealt a severe blow to one of China's largest groups of inorganic chemical plants, the Yung Li Chemical Industries, Ltd., whose development was expected to assist in laying the foundation of a modern chemical industry. One of the company's nitric-acid plants, removed from Kiangsu Province, will probably be returned before the end of the year. Valued at $500,000, the plant has a daily capacity of 100 metric tons. The Yung Li plant at Tangku, Hopei, producing soda ash and caustic soda, was taken over by the Japanese and operated by the North China Development Company. Current output of soda ash has been about 50 per cent of requirements, but when the Yung Li plant in Szechwan is completed, production from that factory plus that from the Tangku works is expected to make China almost self sufficient in soda ash.

Another important concern, Ta Chen Industrial Corporation, is producing vari-

ous chemicals including calcium carbide and sulphuric, hydrochloric, and nitric acids. Soda ash, sodium sulphide, lead and zinc oxides, barium compounds, as well as potassium chlorate and red phosphorous, are also produced at this plant.

The NRC's sulphuric acid plant at Hulutao is producing 50 tons of acid daily, using lead sulphide from Anhwei Province. A factory at Sinkiang has a daily capacity of 1100 pounds of sulphuric acid, while the Northwest Electrolysis Works is building a plant capable of producing 720 tons of caustic soda per year.

Fertiliser Position

A large market exists in China for fertilisers and existing production facilities are inadequate. The Pûkow factory of Yung Li Chemical Industries produces 50,000 tons of ammonium sulphate a year and three former Japanese plants in Taiwan have a combined yearly output of 10,000 tons of calcium cyanamide and 30,000 tons of superphosphate. Deposits of phosphate rock, claimed to be sufficient to yield 2.5 million tons of fertiliser, have been discovered near Fengtal, Anhwei Province.

Prior to 1937, the Chinese paint and varnish industry was expanding steadily, but at the present time the only lithophone factory in the country is the Barium Chemical Works at Shanghai.

The principal product of China's dyestuffs industry is sulphur black, but output is restricted by a shortage of raw materials. Fifty factories, with a combined potential daily production of 133,000 lb., are awaiting an improvement in the supply position.

Alsace Potassium Mining

The Mines de Kali Sainte-Thérèse, Mulhouse, the only private potassium mining company in Alsace, reports a net profit of 43.3 million francs in 1947 compared with the previous year's figure of 74.8 million francs. Reduced domestic sales and the effects of the over-valuation of French currency upon exports are given as the principal reasons for the fall in profits. The report adds, however, that mining operations during the past year produced a more normal level of 835,201 metric tons, compared with 670,303 tons in 1946 and results for the current year are expected to equal the best pre-war years. Despite the reduction in profits, the company has declared a dividend of 30 francs per share, equal to 24 per cent of the share capital of 160 million francs.

New U.S. Wattmeter

Wider Application Claimed

A NEW light-beam wattmeter developed to meet industrial demands for a portable, accurate instrument giving readings in the low-wattage and low-power factor ranges for frequencies of 25-3000 cycles has just been announced by the General Electric Company's Meter and Instrument Divisions (U.S.A.).

The new wattmeter's portable construction, high sensitivity, and low instrument losses make it applicable in cases where conventional wattmeters and pivoted type dynamometers operate under definite limitations.

The apparatus can be used in instrument-calibrating laboratories as a transfer standard from DC to AC current wattage for the calibration of other wattmeters and in the laboratory testing of small reactors, relays, fluorescent lamps, fluorescent lamp ballast, and core-cross measurements.

Safety Device

The instrument, completely self-contained in a walnut case, is available in two sizes—the large, high-sensitivity model and a smaller unit. Binding posts, current-circuit fuse, and the light source connection are mounted on an insulated plate at the back of the instrument, thereby reducing the possibility of operators making contact with a live circuit.

The scale, approximately 11 in. long, on a multi-range instrument is usually calibrated for lower-current circuit and 150-volt potential circuit.

The indicating element is built on the air-core electrodynamic principle with a taut suspended air-dampened moving element. To reduce further eddy current and hysteresis losses, few metal parts are used, making possible accurate operation at the higher commercial frequencies.

A beam of light, triple-reflected from front surface mirrors, produces a sharp line image on the translucent scale. The relatively long light beam helps to provide the high sensitivity and permits full-scale indication with only a 7-degree angular deflection of the moving element.

Full-scale wattage is indicated at power factors as low as .08, and full-scale indication obtained at ratings as low as 2 watts for 120 volts operation.

Lignite Prices Cut.—To help to sell lignites produced in Italy, the State Railways of the country are allowing 10 per cent discount upon the usual rates for the fuel.

U.K. CHEMICAL PLANT IN SPAIN

To Increase Production of Nitrate Fertiliser

FOLLOWING the article on "Spanish Plans to Raise Nitrogen Production," in THE CHEMICAL AGE of August 21, it is interesting to learn how a British firm is participating in the development of the Spanish nitrogen industry, adding thereby to Britain's export total of chemical plant.

Bamag, Ltd., is the main contractor to Nitratos de Castilla, S.A., for its nitric acid plant which will be located at Valladolid and is based on the combustion of ammonia in air enriched with oxygen. The latter gas is obtained as a by-product from the manufacture of electrolytic hydrogen for ammonia synthesis. Absorption of the nitrous oxides is conducted under pressure slightly above atmospheric. The plant will produce a nitrogenous fertiliser which will consist essentially of a mixture of ammonium nitrate and limestone.

To facilitate erection of the plant for Nitratos de Castilla, S.A., a special technique has been used by the drawing office of Bamag, Ltd. The first step was an isomeric layout drawing of the absorption section, which is designed to prove also of great assistance in the training of personnel before the plant is started up and put into operation.

Construction of the plant is stated to be well under way. The photograph here was taken recently and represents the same part of the plant as the layout drawing. It shows the supporting structure of the complete absorption section, the first of the series of absorption towers, and the plinths for the remaining towers and the storage tanks in course of erection.

Mention should also be made that Energia e Industrias Aragonesas, S.A., which is awaiting the completion of the hydroelectric schemes in the Upper Pyrenees of Aragon, has already ordered a nitric acid plant from Bamag, Ltd. The manufacture of this equipment is, we understand, almost complete, and erection is to be started before the end of this year.

New Oil Discovery in U.S.—A new oil producing zone in Gaines County, West Texas, has been discovered by the Shell Oil Company.

The technical drawings take physical shape: the first absorption tower erected and the others at the foundation stage at Valladolid

C

BAROMETER OF CHEMICAL INDUSTRY

Fuller Production and Use in June and July

CONSUMPTION in the principal chemical and related industries in June, showed a slight general increase according to figures published by the Monthly Digest of Statistics (No. 32, August, 1948) of the central statistical office. The July figures, in the few instances when these are provided, tend to show an even greater acceleration of production, when compared with the July figures a year ago. On this basis, marked improvements are shown to have taken place in respect of sulphuric acid, molasses, fertilisers, iron and steel. Consumption is shown to have followed the upward trend closely, in most products, but the stock position, with a few exceptions, remains strong.

Numbers employed in the chemical, explosives, coke-oven, and by-product works were again slightly lower, but a small rise in the number of male workers in the oils, greases, paints, varnishes, etc., maintained the steady increase bringing the total of both sexes to 116,800.

Natural rubber showed an increase in consumption over the corresponding period last year.

Principal categories recorded of chemical production and use are as follows:—

	June, 1948 Thousand Tons			June, 1947 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	129.2*	—	66.1*	107.0*	113.0*	62.8*
Sulphur	—	22.0*	86.4*	—	17.9*	79.0*
Pyrites	—	16 8*	70.0*	—	14.4*	76.0*
Spent oxide	—	17.0*	159.0*	—	13.8*	151.5*
Molasses	10.3	28.3†	192.5	8.8	31.8†	124.1
Industrial alcohol (mil. bulk gal.)	1.93	2.30	7.07	2.08	2.45	4.61
Superphosphate	82.1	47.2	88.4	80.9	48.0	133.9
Compound fertilisers	88.2	20.4	116.8	76.0	29.1	89.6
Agricultural lime	—	391.2	—	—	232.3	—
Ammonia	—	6.36‡	4.93	—	5.26‡	3.28
Phosphate rock (agricultural)	—	69.0	162.7	—	60.1	141.1
Phosphate rock (industrial)	—	6.8	29.7	—	5.4	33.0
Virgin aluminium	2.53	14.7	—	2.53	13.2	—
Magnesium	0.29	0.36	—	0.21	0.63	—
Virgin copper	—	31.7	85.1	—	31.1	102.3
Virgin zinc	—	19.8	51.1	—	19.2	26.0
Refined lead	—	18.0	28.0	—	16.9	22.3
Tin	—	2.21	15.2	—	2.18	15.0
Zinc concentrates	—	14.7	47.0	—	14.2	76.0
Pig iron	171.0*	—	272.0	143.0*	—	406.0
Steel ingots and castings (including alloys)	243.0*	—	—	232.0*	—	—
Rubber:						
Waste collected	0.05	0.29	10.1	0.13	1.47	60.8
Reclaimed	0.55	0.54	3.96	0.48	0.53	4.79
Natural	—	3.87	135.8	—	3.19	147.0
Synthetic	—	0.05	2.19	—	0.03	2.81

* July. † Distilling only ‡ Average of five weeks.

New British Standards

The revision of standards to the following classes of fire extinguishers has just been published by the British Standards Institution: (i) Portable Chemical Fire Extinguishers of the Water Type (Gas Pressure); (ii) Portable Fire Extinguishers of the Water Type (Soda Acid); (iii) Portable Chemical Fire Extinguishers (Foam Type). In each case the principal object of the revision is to provide for welded construction in addition to the construction already covered in the original document. Full details are provided of the materials to be used, methods of construction, tests to be carried out on the finished extinguisher, and the required markings.

Industrial Water Heaters

Although the prices of domestic gas water heaters are still rendered almost prohibitive by the effect of the Purchase Tax, larger scale models for industrial use which are not subject to the tax, may be obtained for a reasonable outlay. A sink water heater, for example, at £7 provides ample hot water service for all washing and cleaning purposes. A boiling water heater at £10 15s. offers additional facilities of warm, hot, or boiling water at the turn of a tap. These two new Ascot heaters are available for delivery and installation in factories, shops, stores, hospitals, etc., excluding professional and commercial offices.

DIATOMITE FROM SKYE

Commercial Quantities Soon to be Produced

by ROBERT H. S. ROBERTSON, M.A., F.G.S.

AFTER a lapse of many years, the diatomite deposit of Loch Cuithir, near the famous Storr Rock, in Skye, is being worked again. In a matter of months, commercially significant tonnage of diatomite will be transported from the Misty Isle.

Scottish Diatomite, Ltd., was recently registered as a company to work the deposits, and one of the four subscribers is resident in Skye. Two more are professional men and the fourth is Mr. Hugo B. Millar, of R. D. Millar & Co. (Glasgow), Ltd., 73 Robertson Street, Glasgow, C.2, who is the moving spirit of the enterprise. Mr Millar has taken over the rights of development from another Glasgow firm which had had the deposit carefully surveyed by auger and samples analysed by the Geochemical Laboratories, Ltd., of Alperton, Middlesex. A research and development programme for further work is in hand, and some of the results obtained so far are given in the present account.

Ten samples have been carefully analysed from different parts of the deposit. Table 1 gives results of the analysis of the sample containing most silica, one containing the least silica and a third nearest to the average of the ten. Results are expressed as a percentage of the calcined material and of the material dried at 105° C.

TABLE 1.

	Calcined			Dried		
	Best	Average	Worst	Best	Average	Worst
SiO_2	90.90	84.78	80.36	81.08	72.07	67.45
Al_2O_3	3.29	6.13	7.01	2.93	5.21	5.88
Fe_2O_3	2.25	3.99	5.85	2.01	3.39	4.93
MgO	1.42	1.55	2.61	1.26	1.32	2.19
CaO	1.23	1.97	2.21	1.10	1.67	1.86
Na_2O...	0.32	0.66	0.49	0.28	0.57	0.41
K_2O	0.07	0.16	0.08	0.06	0.14	0.06
TiO_2	0.35	0.52	0.79	0.32	0.44	0.66
SO_3	—	—	—	0.12	0.11	0.09
S	—	—	—	0.19	0.27	0.42
H_2O + & carbonaceous matter ...	—	—	—	10.50	14.62	15.45
	99.83	99.76	99.40	99.85	99.81	99.40

In actual quantity there appears to be rather more of the average to best material than of the poorer qualities. The analyses throw but little light on the nature of the non-diatomaceous materials; microscopic examination shows a substantial amount of a clay-like mineral which readily stains with basic dyes, and only very small quantities of felspar, quartz, pyrite and magnetite.

X-ray photographs, thermal dehydration curves and differential thermal analysis of various elutriated fractions, carried out by the Macaulay Institute for Soil Research, in Aberdeen, all failed to show any sign at all of the mysterious clay-like substance, yet it can be distinctly seen under the microscope, and can be readily concentrated in the coarser fractions by elutriation. A sample of the clay-material thus concentrated absorbed 19 milliequivalents of methylene blue per 100 grams of the dry material, under conditions where this test normally gives close results to base exchange capacity. This result led to the belief that the clay might be an illite, whose base exchange capacity varies from 20-30, but no sign of this clay-mineral can be detected by the excellent research methods employed.

Differential analysis shows that there must be less than 1 per cent of free quartz, but microscopic examination shows that the quantity is insignificant. The very small amount of carbonate impurity is almost entirely concentrated in the finest fraction, finer than 1.4 equivalent spherical diameter, and even then mostly finer than 0.4. In fact, this extremely fine fraction is the only one to give an interesting thermogram by differential thermal analysis, as pyrite is also present only in this fraction. The X-ray method revealed a small amount of felspar, but no quartz.

If the elutriation fraction finer than 0.01 mm. is plotted against the silica content of the moisture-free diatomite, one gets a graph (Fig. 1) as illustrated. Only one point, No. 26, is far from a curve, but this sample is known to be different from all the others in having a very much lower loss on ignition. Absolutely pure diatomite has a water content of about 10.5 per cent, so it would appear from the first graph that about 68 per cent of absolutely pure diatomite would be finer than 0.01 mm. and 32 per cent coarser. The other end of the

curve points in the direction of 60-65 per cent. which means that the silica content of

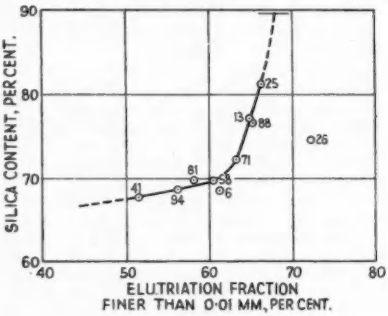


Fig. I

the impurities alone may be in the order of 60-65 per cent.

The second graph (Fig. 2) shows the "loss on ignition" plotted against silica content. The loss on ignition includes carbonaceous matter and water of hydration driven off above 105° C.; it does not include sulphur or carbon dioxide from carbonates, which were analysed separately and deducted from the total loss on ignition.

Here again, all samples lie near a curve except the anomalous No. 26. At the one end of the scale one can see a tendency to approach 90 per cent for the theoretically pure diatomite; but at the other end of the scale interpretation is really too risky. If the impurities have a silica content of 60 per cent, then they would have a loss on ignition as high as 20-23 per cent, but if the impurities contain 65 per cent of silica, the loss on ignition is likely to be between 17 to 18.5.

The gradual increase in loss on ignition with decrease in silica content is mainly due to increase in content of carbonaceous impurity as there is no evidence that inorganic constituents would have progressively higher degree of hydration; in fact, they are probably rather consistent in composition.

Analyses re-calculated to the basis of calcined material show, in fact, that there is very little variation in composition in the whole deposit, the silica content varying between about 80 and 90 per cent. This uniformity of composition and apparent ease of purification gives promise of superior grades in the future. The colour of the calcined material is a warm pink, which makes it suitable for cosmetics. The finest elutriation fractions contain most iron and therefore burn the deepest colour.

Specific gravity, packing density, and elutriation analyses have been carried out on the ten chemically analysed samples, and from these results the percentage of voids has been calculated for loose and compact air-dried material. The absorptive capacity (a volume of liquid absorbed by unit volume of diatomite) is taken as being ¾ of the total calculated from the voids, since a completely saturated sample is a rather weak paste. At ¾ of the theoretical figure the mixture is substantially "dry." Figures are given in Table 2 for the same three samples as are quoted in Table 1.

TABLE II.

		Best	Average	Worst
Specific gravity, 15.5°C.	...	2.00	2.00	2.02
Weight per cu. ft., loose ,lb....		10.2	10.7	12.2
Weight per cu. ft., compact lb.		18.3	19.3	23.2
Voids, loose, per cent	...	91.9	91.4	90.3
Voids, compact, per cent.	...	85.6	84.5	81.9
Absorptive capacity ...	...	3.7	3.9	3.7
mm Per cent.				
Elutriation —0.01	...	66.1	63.1	51.6
0.01 —0.025	...	20.0	13.2	15.3
0.025—0.05	...	10.6	20.2	27.2
+0.05	...	3.3	3.5	5.9

It can be seen from these figures that the high absorptive capacity is not much affected by the amount of non-diatomaceous impurity, though the packing density of the poorest sample is definitely lower than that of the best and average samples. The diatomite is in very fine particles and fairly evenly graded, and is essentially free from grit. Although the hardness of the clay-like material is unknown, it is believed not to be very different from that of the diatoms; the tests carried out so far suggest that the material is highly suitable for use in abrasives, polishes and scourers.

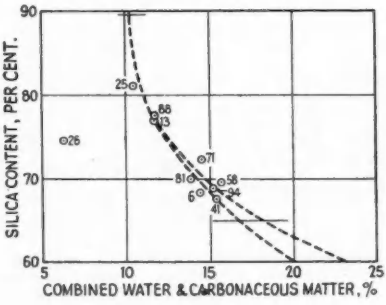
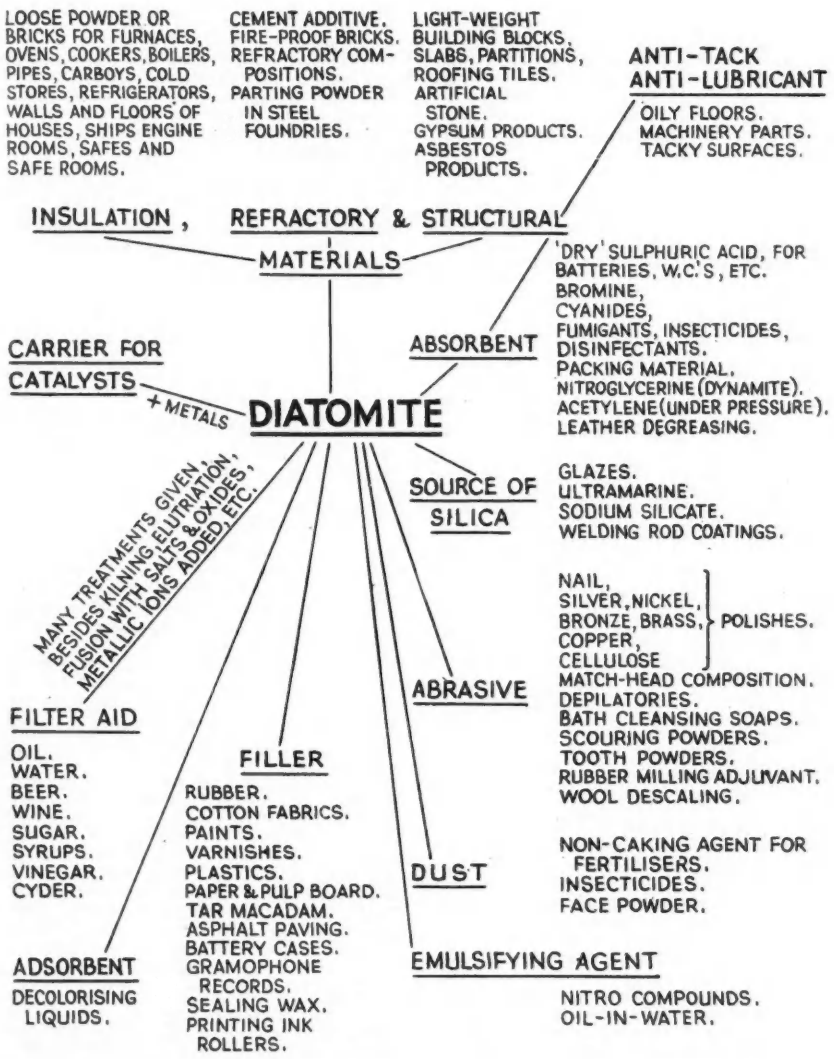


Fig. II

The specific surface of one sample by the air elutriation method of Lea & Nurse was nearly 20,000 sq. cm./g. This very large surface is probably of importance in many applications.

The development of a raw material in such

PROMISING APPLICATIONS OF DIATOMITE


LOOSE POWDER OR BRICKS FOR FURNACES, OVENS, COOKERS, BOILERS, PIPES, CARBOYS, COLD STORES, REFRIGERATORS, WALLS AND FLOORS OF HOUSES, SHIPS ENGINE ROOMS, SAFES AND SAFE ROOMS.
CEMENT ADDITIVE. FIRE-PROOF BRICKS. REFRACTORY COMPOSITIONS. PARTING POWDER IN STEEL FOUNDRIES.
LIGHT-WEIGHT BUILDING BLOCKS, SLABS, PARTITIONS, ROOFING TILES. ARTIFICIAL STONE. GYPSUM PRODUCTS. ASBESTOS PRODUCTS.
ANTI-TACK ANTI-LUBRICANT
OILY FLOORS. MACHINERY PARTS. TACKY SURFACES.
INSULATION, REFRACTORY & STRUCTURAL MATERIALS
'DRY' SULPHURIC ACID, FOR BATTERIES, W.C.'S, ETC. BROMINE, CYANIDES, FUMIGANTS, INSECTICIDES, DISINFECTANTS. PACKING MATERIAL. NITROGLYCERINE (DYNAMITE). ACETYLENE (UNDER PRESSURE). LEATHER DEGREASING.
ABSORBENT
CARRIER FOR CATALYSTS + METALS
DIATOMITE
MANY TREATMENTS GIVEN, BESIDES KILNING, ELUTRIATION, FUSION WITH SALTS & OXIDES, METALLIC IONS ADDED, ETC.
SOURCE OF SILICA
GLAZES. ULTRAMARINE. SODIUM SILICATE. WELDING ROD COATINGS.
NAIL, SILVER, NICKEL, BRONZE, BRASS, COPPER, CELLULOSE } POLISHES.
ABRASIVE
MATCH-HEAD COMPOSITION. DEPILATORIES. BATH CLEANSING SOAPS. SCOURING POWDERS. TOOTH POWDERS. RUBBER MILLING ADJUVANT. WOOL DESCALING.
FILTER AID
OIL. WATER. BEER. WINE. SUGAR. SYRUPS. VINEGAR. CYDER.
FILLER
RUBBER. COTTON FABRICS. PAINTS. VARNISHES. PLASTICS. PAPER & PULP BOARD. TAR MACADAM. ASPHALT PAVING. BATTERY CASES. GRAMOPHONE RECORDS. SEALING WAX. PRINTING INK ROLLERS.
DUST
NON-CAKING AGENT FOR FERTILISERS. INSECTICIDES. FACE POWDER.
ADSORBENT
DECOLORISING LIQUIDS.
EMULSIFYING AGENT
NITRO COMPOUNDS. OIL-IN-WATER.

a difficult locality as Loch Cuithir will be made easier by first working up all possible uses of the most simple processed material first. At present the indications are that the dried lump and dried disintegrated—nominally 100 mesh but actually finer—powder will create a substantial demand which will allow for refinements of technique in processing to be studied and added later.

Laboratory studies suggest that the diatomite is capable of being resolved into a number of interesting grades depending mainly on particle size distribution and total water content. At present, however, plant has been installed for drying and lightly disintegrating only.

The most promising applications of the Skye diatomite are as an abrasive in polishes, scourers, match heads, and other commodities, as an absorbent of acids, solvents, parasiticides, phenols, etc., as an anti-tack or anti-lubricant powder for floors, machinery rollers, etc., as a conditioning agent in compound fertilisers, as an ingredient in welding rod coatings, as a filler in plastics, battery cases, asphalts, etc., and in many constructional materials. It can be used as a loose powdered filling for insulating between walls or sheets, as light weight insulating and refractory bricks, slabs and monolithic constructions, and also to improve the flow properties of cement.

The uses which are suggested in this article can be compared with a large number of published uses of all grades of diatomite, and it will be seen that the Skye material has many openings even in its present state of preparation. The success of the material in these applications will largely determine the technical future of the industry; the North of Scotland Hydro-electric Board will be providing power from a scheme only a few miles away from Loch Cuithir, and development will certainly be easier when electric power is available.

The author wishes to thank Dr. R. C. MacKenzie for thermal analyses, Mr. Walker for X-ray work, Dr. Hart for microscopical examination, and the Director of the Macaulay Institute where tests were carried out, and Mr. S. G. Henderson for a specific surface determination.

DDT INEFFECTUAL?

THE immunity of the house fly to DDT is reported by Dr. S. F. Chellappah, Director of Medical and Sanitary Services, Ceylon, who has recently returned from a trip to Europe. He said that he had visited the Pontine marshes in Italy to see the methods adopted to combat the fly menace and malaria. These had been rather serious, but an intensive campaign of DDT spraying at first seemed satisfactory; after a time, however, it was found that while it continued to be fatal to mosquitoes, the house flies did not succumb.

Octa-Klon was then tried with success. Dr. Chellappah states that he thinks this should prove an excellent insecticide to meet the fly problem in Ceylon. It is at present expensive, as it is being manufactured only in small quantities.

Mechanical Handlers

The latest types of dumpers, loaders and shunters, will be shown by E. Boydell & Co., Ltd., of Manchester, at the Public Health and Municipal Engineering Exhibition to be held at Olympia, London, in November. The Muir-Hill dumpers have a capacity ranging from 3 to 6½ cu. yd. Double articulation gives greater stability to the new loaders which can work under a roof 8 ft. in height, and has an under bucket clearance when tipped of 10 ft. 8 in. For handling wagons, the Muir-Hill shunter is capable of moving 100 tons on straight level rail.

SCOTTISH NEWS ITEMS

IN the course of a visit to the Scottish alginic industry's factory at Orasay, South Uist, last week, Mr. Tom Fraser, Under Secretary for Scotland, and Lord Morrison were shown by Mr. Charles Cameron, manager, the latest products made from seaweed. Custard powder, nylon thread, non-inflammable cinema curtains, uncrushable fabrics, hygienic gauze for internal dressings and moulds for taking impressions of false teeth were among the articles shown. During the past year, over 6000 tons of seaweed for the factory have been gathered by South Uist crofters.

Oil-from-Herring Plant.—The first commercial oil-from-herring plant to be assembled in Scotland, which has been established at Wick by the Herring Industry Board, began working last week. The plant is the result of a long period of research and experiment during which D.S.I.R. chemists have worked on methods of converting herring oil to commercial use. The bulk of the oil derived will go into the manufacture of food products, and it has been indicated that there will not be any surplus available at present for subsidiary or by product purposes. These will develop at a later stage.

Unrest in Scottish Oil Industry.—Strike action on September 8 was threatened last week by 600 employees at the Pumpherston works of Scottish Oils, Ltd., because one man had refused to join the National Union of Shale Miners and Oil Workers.

HIGH STRENGTH HYDROGEN PEROXIDE

Improving the Purity of Solutions

by V. W. SLATER and W. S. WOOD

AMONG the more inactive surfaces of vessels used as containers of hydrogen peroxide are those of glass, quartz, and certain synthetic materials but, with the possible exception of the latter, these materials are not always suitable for construction purposes. However, the surface activity of aluminium and certain types of aluminium alloy, *e.g.*, magnesium aluminium alloys, is not very much greater than that of glass under normal conditions, and therefore, we find that these materials are used extensively in the handling and use of hydrogen peroxide.

The above statements must be qualified by reference to the purity of the solution in contact with the material. For example, considerable decomposition may take place in glass vessels if, as may happen, sufficient alkali is dissolved from the glass to neutralise the minute trace of acidity in the solution and, as a result, the solution becomes unstable. This effect in glass vessels is not likely to result if the hydrogen peroxide be impure, due to the presence of traces of acid.

Contact with Metal Surfaces

On the other hand, if the hydrogen peroxide solution is in contact with metal surfaces and is slightly acid, it may dissolve the metal, giving cations having pronounced activity. This can be illustrated by reference to copper which, in contact with commercial solutions of hydrogen peroxide containing traces of acid is rapidly corroded, giving copper ions in solution and rapid decomposition. In contact with pure solutions, however, copper is only slowly attacked, and the rate of decomposition is not so much increased.

It is important to note that the total decomposition caused by the heterogenous reaction is dependent upon the ratio of the surface area in contact with unit volume of solution and, therefore, with large containers which have a low surface/volume ratio, the total decomposition due to this factor is less than that for small containers, where the surface/volume ratio is greater.

Mention has often been made in the literature to the decomposition caused by dust particles in hydrogen peroxide. It has been definitely established that certain types of suspended matter do promote decomposition, even though the amount is small and not readily visible. In fact, certain types of stabilising substances are assumed to function because they neutralise the effect of suspended matter.

Stabilising Factor

It is well known that the rate of decomposition of hydrogen peroxide increases with increasing temperature. The rate of decomposition is doubled for every 10°C. rise in temperature, and the effect of temperature becomes particularly noticeable at 50/60°C. However, solutions of hydrogen peroxide can be stabilised so that there is little decomposition under most conditions when stored at temperatures up to 40°C.

Decomposition may be promoted by light, *i.e.*, photo-chemical reactions, but this is usually of less practical significance than the other factors since it is unusual for the solution to be exposed for any length of time to actinic rays. Thus stability is mainly dependent upon the purity of the solution, the surface in contact therewith and the temperature to which it is subjected. These factors operate with both stabilised and unstabilised solutions.

There are many references to substances which are claimed to be stabilisers or negative catalysts, but by modern standards it would be difficult to substantiate many of the claims. The majority of substances recommended are organic compounds, but only a few of these are now considered to have high stabilising properties, and their action is usually more effective in the low strength range. The Germans claimed to have discovered a new organic stabiliser, 8-hydroxyquinoline, which was said to function because of the facility with which this substance forms complexes with certain ions, particularly aluminium, a metal used for containers.

Inorganic Stabilisers

Among inorganic stabilisers, the best known are the phosphate compounds, particularly sodium pyrophosphate.

One factor generally accepted is that the solution must be slightly acid, but for the pure high-strength solutions, the degree of acidity is very low, of the order 0.5 milli equivalents per litre for 90 per cent pure solutions compared with 20 milli equivalents for the 30/35 per cent commercial solution.

(*Continued overleaf*)

The previous parts of this paper appeared in our issues of August 28 and September 4.

It is common practice to use two or more stabilisers and, in fact, for the most stable of the German products three substances were added, phosphoric acid, sodium acid pyrophosphate and 8-hydroxyquinoline.

Probably the most important factor which has improved the stability of hydrogen peroxide is the improvement in the purity of the solutions now produced. One American manufacturer claims to have produced a solution sufficiently pure to be stable without any addition of a stabiliser.

The actual study of the stability question from the practical point of view is not simple owing to the difficulty in obtaining reproducible results. This is probaby due to the fact that the final stability of the solution is the result of the combination of the factors outlined above. Figures quoted for stability should indicate the conditions under which they have been obtained, for example, the size and material of the container, the temperature of storage and the purity of the solution. It is the lack of reference to these factors which makes many results given in the literature of little value.

Modern Standards

By modern standards, for practical conditions of use or storage, a loss of 1 per cent in strength, *i.e.*, drop from, say, 90 per cent to 89 per cent, may take place over one year at temperatures normally experienced in this country,

On the other hand, if the material is to be used for storage, it must have a low surface decomposition factor as well as a satisfactory resistance to corrosion. Therefore, whereas some grades of stainless steel may be suitable for certain pump or valve parts, they would be unsuitable for long-term storage tanks.

It is in any case unwise to allow even small quantities of hydrogen peroxide to be retained within a unit made of material having a high surface decomposition factor; in this case it is advisable to provide suitable draining facilities.

It is also important to bear in mind that if the hydrogen peroxide is allowed to come into contact with certain unsuitable materials, even for short lengths of time, the solution may be rendered unfit for subsequent long-term storage even in a suitable container, since the original contact may have promoted instability.

It is therefore necessary to refer results quoted for the suitability of a material for hydrogen peroxide to the purity of the solution, the degree of corrosion of the metal, the amount of decomposition occurring and the use for which it is suggested, in addition to such factors as temperature, etc.

In carrying out corrosion tests, it is advisable to guard against photo-chemical decomposition, since this, in some cases, may be greater than the actual surface decomposition.

The most suitable metal for pure hydrogen peroxide solution is aluminium, preferably of 99.5 per cent or higher purity and, therefore, storage tanks are almost exclusively made of aluminium. The magnesium aluminium alloys containing up to 7 per cent magnesium show good corrosion resistance with low surface decomposition factors and, since these alloys have a greater mechanical strength than aluminium and better working properties, they may be used for castings and machine parts. The aluminium silicon alloys are not so satisfactory as regards corrosion resistance and surface decomposition, but are sometimes used.

Stainless austenitic steels generally show good resistance to corrosion but often have a high surface decomposition value which makes it unwise to use them for storage containers. The suitability of these steels can be improved by acid pickling or by imparting a high polish to the surface. Such materials, therefore, find application in equipment for handling hydrogen peroxide, *e.g.*, pumping. Corrosion tests have indicated that tin, nickel and heavily chromium-plated surfaces may find application for short-term contract.

Of the unsatisfactory metals, mention should first be made of lead, which promotes violent decomposition with high-strength hydrogen peroxide. Copper or copper alloys are unsatisfactory owing to the destabilising action of micro quantities of copper ions. Mild steel and iron, whether wrought or cast, are rapidly oxidised and cause decomposition.

Satisfactory Plastics

Some of the modern synthetic materials show considerable resistance to corrosion and have low surface decomposition factors. Both plasticised and unplasticised polyvinyl chloride is usually satisfactory with minor differences in behaviour according to the plasticiser used.

Typical suitable grades of polyvinyl chloride are Koroseal and the German Mipolam and Vinidur. Polythene (or alkathene) shows behaviour similar to polyvinyl chloride, while polystyrene and possibly butyl rubber also give reasonably satisfactory results. Methyl methacrylate (Perspex) is fairly satisfactory for, say, 30/40 per cent hydrogen peroxide solutions, but is not always suitable for higher strength solutions.

Natural rubber is usually readily oxi-

dised, even with comparatively low-strength solutions.

Many efforts have been made to provide a suitable non-active or non-corroding surface by spraying surfaces with certain metals or synthetic materials, but, so far, no great success has attended this work since the films are usually sufficiently porous to allow the hydrogen peroxide to penetrate, causing surface decomposition, and eventually "lifting" the film.

Closure of Containers

It will be gathered from the above that special types of closure are necessary for storage containers since there is always some decomposition, however slight, and always the possibility of contamination with active catalysts. Thus, unless the oxygen liberated is allowed to pass out of the container, dangerous pressures may build up, with ultimate bursting of the vessel.

The necessity for such closures complicates the transport problem and, therefore, much thought and effort has been given to the design of the closure. A typical pattern comprises a perforated domed screw cap. To prevent splashing of liquor into the cap a perforated tube is provided, closed at the bottom and filled with small Raschig rings.

With the high-strength product, splashing of the liquid must be avoided, as it may cause ignition of organic matter with which it comes into contact, resulting in serious fires.

With the exception of small quantities normally required for experimental work, and for which a suitable glass container is used, the transport of high strength hydrogen peroxide is invariably in aluminium containers. These containers include large rail tanks of about 20 tons capacity, road lorry tanks of 2 to 3 tons capacity and drums 100 to 400 lb. capacity.

[The authors of this paper conclude with acknowledgments to the directors of Laporte Chemicals, Ltd., who sanctioned its publication, and Messrs. C. O. Bishop, G. Clennett and W. R. Holmes, who were among those who collaborated in its preparation.]

REFERENCES

[11] Giguère and Maass, *Can. J. Res.*, 1940, 18B, 66.
[12] Giguère and Maass, *Can. J. Res.*, 1940, 18B, 181.

(Concluded)

New U.S. Chemical Plant

Subsidiary of Phillips Petroleum Co.

THE Phillips Petroleum Company of the United States has expanded its chemical activities through the formation of a wholly-owned subsidiary, the Phillips Chemical Company. The new company has leased on a long-term basis the Cactus Ordnance Works at Etter in the Texas Panhandle and will also build a new ammonium nitrate plant at Etter. Cactus Ordnance is one of the largest ammonia plants in the world and will be used by the company to produce ammonia for nitrogenous fertilisers. It is expected that present plant capacity will be doubled from approximately 70,000 tons to more than 140,000 tons. Under the lease agreement, the United States Government may purchase products from this plant for its foreign relief export fertiliser programme until June 30, 1952.

The company's plans for the future include the acquisition of a large site on the ship channel near Houston, Texas, where a plant will be built for the manufacture of sulphate of ammonia. This site is of sufficient size to permit the addition of the several other chemical plants which are planned.

Boake Roberts in S. Africa

Australian Plant Also Projected

SPEAKING at the recent fifty-first annual general meeting of A. Boake Roberts & Co., Ltd., the chairman, Mr. E. J. Boake, announced that early next year the company hoped to start manufacture on a small scale in South Africa. They had, he said, registered a company there under the style of A. Boake Roberts & Co. (S.A.) Pty., Ltd. Their plans for Australia were not so far advanced. It was their intention, said Mr. Boake, as soon as circumstances permitted, to manufacture some of their products in that country, and they had therefore taken steps to form a separate company under the style of A. Boake Roberts & Co. (Australia), Ltd.

The company's net profit for the year, after all charges, but before making reserves for taxation, was announced to be £229,007, compared with £238,279 a year ago.

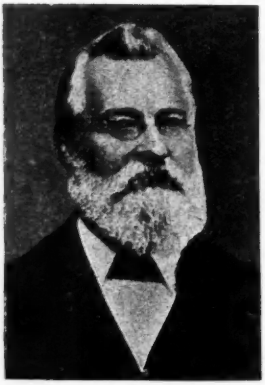
U.S. Coal Experts in Australia.—American coal experts have advised the Australian Joint Coal Board that 107,000,000 tons of coal now used as pillars in Australian black coal mines can be extracted with the aid of machines. The quantity of coal in the pillars represents 8 to 10 years' normal production.

J. A. R. NEWLANDS (1837-1898)

A Pioneer Whom the Chemists Ridiculed

by JAMES A. CAMERON, B.Sc.

EUROPEAN science in the 19th century was all too prone to disparage the creative work of the young scientist Pasteur, and Van't Hoff, Arrhenius were among the many who suffered in their earlier years from the sterile, abusive criticism of the learned



John Newlands

greybeards; it says much for their moral stamina that they were not deflected from their purpose by "lack or honour in their own countries."

The twentieth century has a better record in this respect—it is now commonly recognised that it is the young scientist to whom we must look to continue the course of innovation—and it is difficult to-day to understand the attitude of mind of those who were often deliberately cruel to the young men and women, who sometimes saw more clearly than their elders.

Of all who experienced such treatment, none suffered more crushing ridicule than the Englishman whose death was reported in the issue of *Chemical News*, dated August 18, 1898, in the following brief notice:—

> "We regret to see the announcement of the death of Mr. J. A. R. Newlands, to whom belongs the credit of the discovery of the periodic relations between the atomic weights of the elements. In the year 1887, Mr. Newlands was awarded the Davy Medal of the Royal Society in recognition of his work."

Thus quietly ended the career of one who had played the leading rôle in what was perhaps the most unhappy incident in the history of British science.

John Alexander Reina Newlands, born in Southwark, London, in 1837, was the second son of the Rev. William Newlands, a Master of Arts of the University of Glasgow and a minister of the Established Church of Scotland. Of John's earlier years not much is known, for he was educated privately by his father; that this training would be on thorough lines and not devoid of the liberal arts seems to be guaranteed by Scottish tradition and the Italian descent of his mother. In the light of subsequent events it would, however, appear unfortunate that he ever became acquainted with music! He must soon have acquired a taste for chemistry, for in October, 1856, he entered the Royal College of Chemistry as a student under Hofmann and, after one year at the College, became assistant to Prof. Way, chemist to the Royal Agricultural Society.

In 1860, the young Newlands, inspired by the call which has led so many Englishmen into distant lands to help the oppressed, interrupted his studies to journey to Italy to join the insurrectionary movement under Garibaldi. Not until the conclusion of the campaign did he return to England to resume his work with Prof. Way.

There is no record of his meeting with Cannizzaro during this Italian adventure, but undoubtedly the keen young chemist must have been greatly influenced by the Karlsruhe Conference of 1860, at which the hypothesis of Avogadro was brought out from its 50-year old obscurity, to make clear the concept of the molecule and to clarify the ideas of both Mendeléeff and Lothar Meyer, the latter relating that "it was as though scales fell from my eyes, doubt vanished and was replaced by a feeling of peaceful certainty." Such an historic pronouncement could not have escaped the notice of the youthful and zealous chemist.

Analyst and Teacher

In 1864, Newlands left Prof. Way and began to practise on his own account as an analytical chemist in the City. About this time and for some years to follow, he taught chemistry at the Grammar School of St. Saviour, Southwark, at the School of Medicine for Women and at the City of London College.

One can picture Newlands, full of confidence and energy, his mind revolving new ideas, still to be formulated, of a grand and

orderly arrangement of all the materials of the Universe. He may well have been impatient with the older chemists, who had for so long rejected all attempts at classification of the elements, from Prout's hydrogen hypothesis to Dobereiner's triads, and who had ignored the vitally important "Hypothesis of Avogadro."

An enormous amount of work must have been packed into the period 1864-65—he mentions trying other schemes, including one based on density—for in August, 1865, fully four years before the publication of either Mendeléef's or Lothar Meyer's findings on the same topic, Newlands, in a letter to the Editor of *Chemical News*, split his famous infinitive in the following terms:—

"If the elements are arranged in the order of their equivalents, with a few slight transpositions, as in the accompanying tables, it will be observed that elements belonging to the same group usually appear on the same horizontal line.....This peculiar relationship I propose to provisionally term the 'Law of Octaves'"

This was followed a week later by another letter to the Editor, in which Newlands endeavoured "to show that all the numerical relations among the equivalents, pointed out by M. Dumas and others, including the well-known triads, are merely arithmetical results flowing from the existence of the 'Law of Octaves'."

These two letters, despite the sweeping generalisation which they contain, seem to have made but little impression on the chemical thought of the period. This was not exceptional; new ideas need time for their assimilation. The sequel, however, was distressing.

On March 6, 1866, Newlands, impetuous, thoroughly convinced he was on the right track, expounded these views in a paper read to the Chemical Society, of which he was a member. He must have approached this meeting of the society with high hopes of praise and acceptance of his idea—he was then only 29—and, at the least, of informed discussion by older and more learned fellow-members and criticism which would help to clarify those points which he knew to be still obscure.

Ridicule

The distinguished audience was mainly hostile. "Dr. Gladstone made objection on the score of its having been assumed that no new elements remained to be discovered. The finding of one more would throw out the whole scheme." This objection seemed perfectly valid and was one that Newlands might well have foreseen. Perhaps too he stressed overmuch the musical parallel; scientists are very wary of analogy.

Newlands could not, however, have foreseen the reception which his paper evoked—hilarious, uproarious laughter! The diehards of the Chemical Society enjoyed themselves to the full at the expense of this foolhardy young upstart, who presumed to desecrate Burlington House with such pretentious nonsense—badly prepared at that. Prof. G. F. Foster fairly, if acidly, expressed the feeling of the meeting, when he asked the lecturer if he had ever examined the elements according to the order of their initial letters—and again Burlington House rocked.

For these learned gentlemen it was the most entertaining evening they had had for years. Newlands' ideas were rejected with contempt and ridicule and it was agreed that his discourse was quite unfit for publication in the society's journal.

It is difficult now to understand the indifferent reception of Newlands' views. Certainly they were revolutionary and imperfect, possibly badly expounded; but nothing can excuse the gross breach of good manners. It is possible that had Newlands spoken in broken English and possessed an imposing-sounding Russian name, he would have been received with respect, even if he had used the initial letter classification suggested by Prof. Foster.

Never Recognised

Nor did the Chemical Society ever do full justice to Newlands. The award of the Davy Medal of the Royal Society jointly to Mendeléeff and Lothar Meyer in 1882 for their work on periodic classification must have called disagreeable recollections to some learned minds. The belated recognition of Newlands' prior claim by a similar award in 1887, largely on the representations of Dr. Franklands, of valency fame, was followed by no corresponding gesture on the part of the Chemical Society. Two years later, in 1889, the Chemical Society belatedly paid recognition to periodic classification—the Faraday Medal was awarded to Mendeléeff!

The ridicule of so influential and learned an assembly must have made Newlands distrust his own powers of reasoning. How could he have been led so far astray by this chance resemblance between music and chemical architecture? So many distinguished scientists could not possibly be wrong! Acknowledgment of the correctness of his views came much too late to have any real influence on his subsequent development; thus one of the most remarkable brains of the nineteenth century was lost to theoretical chemistry.

From this time on, Newlands devoted his energies to technical chemistry. He re-

(*Continued at the foot of page* 356)

Another Aluminium Alloy

Ease in Die-Casting

MR. J. B. NEIMAN, manager of the aluminium department of the Federated Metals Division of the American Smelting and Refining Company, New York, recently revealed for the first time the development of a new economical die-casting alloy made of copper, silicon and aluminium, which is said to overcome former problems of drilling, tapping and machining castings made from other alloys. The new alloy will be known as F-4110, under a nomenclature system developed by Federated Metals Division, which reveals the composition of the alloy. The name means 4 per cent copper, 11 per cent silicon, no magnesium and balance copper, Mr. Neiman explained, adding that some of the engineering societies were studying the merits of this nomenclature technique.

The features of the alloy were described by Mr. Neiman as including ease of casting equal to former alloys used by die-casting foundries. However, there is less tendency for castings to weld to the die during the casting process, he said. In physical properties it is claimed to have appreciably higher tensile strength, yield strength, and proportional limit and higher hardness. In addition, the castings have been found to assume a whiter finish after casting, and the final cost of casting is lower because the alloy is generally cheaper than the primary 12 per cent silicon alloys. The product is also more available in supply, Mr. Neiman said, because of the additional copper content, which makes it easier to obtain raw material.

Industrial Brazil

Large Metal and Mineral Development

ACCORDING to the Brazilian Government Trade Bureau in New York, figures of industrial development in Brazil for the ten-year period ending 1947 show substantial advances, especially in basic products such as iron, steel, coal and cement.

In the ten-year period since 1938, output of pig-iron increased 293 per cent, steel 320 per cent, rolled steel 269 per cent, coal 120 per cent, and cement 48 per cent. While in 1938 in the whole of Brazil there were only 10 small mills turning out pig-iron, in 1947 there were 17, apart from the huge new Volta Redonda mills. Compared with eight mills producing steel in 1938, Brazil now has 25 besides Volta Redonda. Some forty Brazilian mining companies are now producing coal, while in 1938 only two main mining areas were being worked. Santa Catarina coal, the country's best, represented only 19 per cent of national output in 1938; now it is about three-quarters, and there has been improvement in the grade of coal available for industrial use. Pig-iron output increased from 122,352 metric tons in 1938 to 480,538 in 1947; steel production rose from 92,420 to 388,024; rolled steel from 8566 to 315,773; coal from 907,224 to 1,995,878; and cement from 617,896 to 913,525 metric tons.

Free Entry for Superphosphate.—The Director General of Customs, Chile, has re-classified ammonium superphosphate (under Tariff No. 951) to permit its importation free of duty.

J. A. R. NEWLANDS

(Continued from previous page)

mained until his death a member of the Chemical Society and took an active part in its proceedings; but speculative chemistry gained little from him.

In 1868, he became chief chemist at Mr. James Duncan's Sugar Refinery at Victoria Docks, where numerous improvements in processing, particularly the so-called alum process for the purification of beet molasses, were due to his inventive genius. In collaboration with his brother, he published a treatise on "Sugar, a Handbook for Sugar Growers and Refiners", and made various contributions to technical literature of the period, including articles on "Sugar" in Thorpe's Dictionary.

Foreign competition gradually brought about the decline of Mr. Duncan's sugar business and finally, in 1886, Newlands resigned from the post, which he had held for 18 years, and joined his brother in independent practice as analytical consulting chemists.

Prompted, no doubt, by the Davy Medal award to Mendeléeff and Lothar Meyer in 1882, Newlands in 1884 published a small volume containing a reprint of all his papers on atomic weights, with some additions embodying his later views on this topic. This volume probably played some part in the tardy recognition which was accorded to Newlands by the Royal Society in 1887; but nothing more of theoretical significance appeared. Newlands had become and remained until the end a competent, industrial chemist, with little remaining of that early genius. That had been massacred to make a chemists' holiday.

A NEW SOURCE OF CRESYLIC ACID

Basic Requirement of Many U.S. Industries

CRESYLIC acid, a coal tar chemical which a generation ago was employed only to kill bed-bugs, is now finding so many new uses in industry that a critical shortage of the compound has developed, Dr. Sidney A. Savitt, of the M. W. Kellogg Company, New York, and Dr. Robert S. Aries of the Polytechnic Institute of Brooklyn, told one of the closing sessions of the 114th national meeting of the American Chemical Society, in Washington, D.C. The shortage is so pronounced, they said, that petroleum chemicals are being utilised to supplement the cresylic acid obtained from coal tar.

They observed that one of the biggest uses of cresylic acid was in the expanding plastics industry. Of the billion pound production of finished plastics in the U.S.A., about a fifth used phenol, cresols, cresylic acids and higher boiling phenols. Cresylic acids were especially useful in mouldings, lamination, coatings of textiles, and adhesives.

Imports from England

In addition to domestic production of 26 million lb. of cresylic acids, the U.S.A. found it necessary to import about 20 million lb., primarily from England. Another large use of cresylic acid was in ore flotation. With the continual impoverishing of the ores mined, more and more agents were needed to aid economic extraction. Luckily, cresylic acid has been found to be a good agent for the manufacture of a large number of ore flotation chemicals, and about 10 per cent of its output now goes into this field.

Textiles, medicinals, dyes and inks consume another 10 per cent of the cresylic acid. Although 30 per cent of the cresylic acid is made from petroleum, much of that goes back into the field, as cresylic acid is used in the refining of petroleum for the manufacture of speciality oils and greases. Cresylic acid is used to inhibit gum formation in cracked gasolines and as a selective solvent in the purification of these gasolines.

Toluene Base

The general field of disinfectants and insecticides consumes about 10 per cent of the cresylic acid as a bactericidal agent.

The speakers went on to say that new uses for cresylic acids are being revealed every day and that in order to relieve the critical shortage research was being carried out at the Polytechnic Institute on the manufacture of synthetic cresylic acids. Since both petroleum and coal tar seemed to be inadequate, a new base had been found. This was toluene, another by-product of both coal tar distillation and petroleum refining. This toluene is converted into a mixture of cresylic acids by means of sulphonation followed by caustic fusion.

Toluene is one of the very few chemicals in ample supply at present, since its main use was in the production of TNT, and output had been enormously expanded in this war.

Staff Training: Scottish Plan to Recruit Technicians

COLVILLES, Ltd., of Motherwell, one of the largest steel manufacturing groups in Great Britain, has launched a comprehensive recruitment and training programme to cover all apprentices in all the company's plants and including apprentices in metallurgy, chemistry, and the various engineering sections.

Behind this scheme is the basic concept of training apprentices to permit them the maximum advancement and expression of their individuality and of creating a reserve of first class technicians in every section to replace the normal losses of existing senior personnel. As the group has a very considerable programme of expansion ahead this scheme is urgently needed.

A similar programme is now being planned to cover the larger number of unskilled and unapprenticed workers throughout the associated steelworks of the company in Scotland with a view to enabling them to improve their status. The present scheme consists of a two-week period of intensive training in classes of approximately 30 with a large number of guest speakers and films, followed by a period of practical work in the steel plants. The third phase involves a further period of intensive work during which the personnel staff will attempt to determine the results of the programme on individuals as well as on the apprentices as a whole.

American Chemical Notebook

From Our New York Correspondent

SALES of the chemical process industries during the first half of 1948 soared to an all-time record of $4.5 million, which was 20 per cent above the total for the same period of 1947. Although part of the gain reflects the continued rise in prices, much of it was due to an enormous increase in output made possible by the largest programme of plant expansion conducted by any industry during 1947-48. Last year, the chemical industry, proportionately the nation's most profitable, spent $1.5 million on new factories and equipment, and it plans to spend another $1.2 million this year. These were among the facts made known to members of the American Chemical Society by Dr. Robert S. Aries, professor of chemical engineering at the Polytechnic Institute of Brooklyn, N.Y. The percentage of return of the chemical industry in 1947 was 19 per cent, compared with 17 per cent for all industry, while the percentage return per sales dollar was about 10 per cent, compared with 7 per cent for all industries. A study of the income of 50 leading chemical companies showed that 15 made a profit of between 1 and 5 per cent on the sales dollar; 14 made between 5 and 10 per cent, 13 between 10 and 15 per cent, five between 15 and 20 per cent, and two more than 20 per cent. The chemical companies spent more for research than any other group, which was probably a principal reason for their success.

* * *

Further application of the science of ultrasonics to industry and agriculture appear to promise important, possibly arresting results. One and a half million vibrations per second, guided to a specific point by means of quartz crystals, will be one of the principal means of harnessing ultrasonic sound waves for industrial use, according to a joint statement issued last week by Dr. T. Smith Taylor, head of the research division of the United States Testing Company, Inc., Hoboken, New Jersey, and S. I. Ward, president of the Crystal Research Laboratories, Hartford, Conn. First steps have already been taken with the establishment of an industrial research programme at the Testing Company's New Jersey laboratories, based on the laboratory models of a new device known as the Ultra-Sonorator. For two years, studies of the possible effects of ultrasonics in agriculture have been made by Dr. Raymond H. Wallace at the University of Connecticut. The next harvest is expected to confirm much of the data last year's experiments indicated. Dr. Wallace states they have already established that rapid germination can be produced with ultrasonic vibrations at 400,000 per second in grains and sunflower seeds, and it was possible entirely new varieties of plants could be produced. The laboratory models of the Ultra-Sonorator have a range from 400,000 to 1,500,000 vibrations per second, sufficient to produce many emulsions and give rise to numerous other interesting phenomena.

* * *

The U.S. Patent Office disclosed last week that Patent No. 2,393,227 covering an apparatus for removing moisture from iron ores has been made available for licensing or sale by the owner, Mary Frenzel Anderson, of Buhl, Minnesota. The patent covers a drying stack for removing moistures from the ores in which a conveyor deposits a mixture of lump and fine ore in a hopper which discharges the ore into the interior of the circular upright stack. There it falls over a conical bell member and passes into the stack. The bell is rotated and distributes the ore below the bell. The fine ore is distributed adjacent to the inner surfaces of the walls, and the lump ore occupies the centre of the stack. A number of triangular heating ducts having escape openings are positioned in the stack in the downward path of the ore between the bell member and discharge opening.

* * *

Despite the fact that United States stocks of tin have been rising for the past two years, the domestic supply of tin is still well below the quantity held when the war started. Reporting on tin operations for the year ended June 30, 1948, the department of Commerce disclosed that stocks rose by 24,338 tons, and that total stocks on June 30 amounted to 77,559 tons, which compares with 67,387 tons on last January 1, and 53,221 tons on June 30, 1947. A comparable figure for January 1, 1942, less than a month after the Japanese attack on Pearl Harbour and the U.S. entry into the war, was 135,939 tons. Almost all the recent increase in stocks was reflected in the amount of pig tin held by the Reconstruction Finance Corporation, which operates the tin smelter for the Government at Texas City, Texas, since all other stocks are minimum working levels, it was noted. Total imports amounted to 87,237 tons.

CHEMICALS FROM SEA WATER

Large Developments of S. African Science and Industry

A SOUTH African company has established a factory near Saldanha Bay to extract and process various salts from sea water, and will soon begin production. The factory will cover an area of about 1000 morgen, and has been designed to supply not only the needs of South Africa for salt and its numerous by-products, but eventually to compete in world markets. The promoters of this new enterprise will at first concentrate on the production of varieties of common salt, and the output is expected to reach 6000 tons a month. It will have the advantage of a high content of iodine, beneficial to health. The second main product which will be derived from the sea water will be magnesium—7000 tons in the first year. This quantity would be sufficient for South African requirements in making substitutes for wood. It will also be used in the foundries for casting fine patterns in iron, brass and other metals. The company will also extract potassium salts from sea water and plans to produce enough not only to supply agriculture, but also the match and other industries. The fourth product of the new factory will be bromine, which will be manufactured in the form of salts and also in its free state. The operations of the company will also include the use of salt extracted from the sea water for the manufacture of substances much in demand in the Union, including caustic soda, soda ash, potassium chlorate, potassium perchloride, bleaching powder and chlorine.

With the advent of atomic energy, graphite has assumed a new significance as an important and strategic factor in atomic piles now operating in Britian and America. What is claimed to be the most modern graphite refining plant in the world has been erected near Krugersdorp. The new plant, owned by the South-West Graphite Mining and Refining Co., is the result of six years' experiments carried out by the company with a pilot plant at Madibi, near Mafeking. It will soon be working to capacity.

* * *

Experiments in rain-making carried out by the Council of Scientific and Industrial Research, the Division of Meteorology and the S.A. Air Force during the first four months of this year appeared to represent a greater advance than had been secured in other countries, said Dr. B. F. J. Schonland, the president of the council. The technique of carrying out experiments of this kind had been developed and largely mastered, and results had shown that artificial stimulation of precification was practicable. Dr. Schonland emphasised that the experiments were in the nature of long-range scientific research. Last summer dry ice was dropped into the super-cooled tops of cumulus clouds on a series of seven flights. The results were observed on a radar cloud-detector built in Johnnesburg, and showed that of the 36 cumulus clouds treated with dry ice only four definitely failed to produce rain. The results of eight experiments were indeterminate. Twentyfour clouds produced rain, but only 14 of these produced rain lasting more than 15 minutes. The South African experiments were the first series of systematic experiments on summer convective clouds.

* * *

With up-to-date mining methods and proper transport facilities, the Union can build up a large export trade in vermiculite with the United States. This is the view of Mr. W. S. Steele, a director of Munn & Steele, Inc., of Newark, New Jersey, when in Johannesburg negotiating with existing vermiculite producers for supplies for his own company and other plants in the United States in excess of 100,000 tons a year. Mr. Steele regards vermiculite as one of South Africa's most important mineral resources, and has made a number of suggestions as to how it can best be exploited. The American demands continue to exceed the supply from all sources by a wide margin. The Palabora district, in the Northern Transvaal, has the world's largest proved deposits of high-grade vermiculite ore. A great advantage is the occurrence of huge tonnages of apatite, phosphate bearing ore, in the same region and frequently in the same deposits.

Leather Trades' Chemists

The annual conference of the Society of Leather Trades' Chemists is planned to be held on Friday and Saturday, September 17 and 18, in the Large Chemistry Lecture Theatre of Leeds University. The chair will be taken throughout by Mr. G. Jessup Cutbush, vice-president of the society. Details are obtainable from Mr. G. H. W. Humphreys, honorary secretary, at the Forestal Central Laboratories, Harpenden, Herts.

Synthetic Mica Threatens Indian Industry

More New Technical Projects

From Our Own Correspondent

THE export to Europe and America of mica blocks, films and splittings from India, the largest producer of this commodity in the world, is threatened by recent developments of mica substitutes produced in Switzerland and the U.S.A. According to Dr. Lal C. Verman, Director of the Indian Scientific Institute, who has returned from a visit to Europe and the U.S.A., manufacturers of electrical machinery there are now making use of silicone-bonded glass cloth in place of mica in some of their products. More important still is the fabrication by a Swiss technologist of "mica powder film," a composition made from cheap powder. A factory is reported to be planned for producing it on a large scale. When commercially available, this mica substitute, it is said, can successfully compete with natural mica in the manufacture of electrical tape. Another serious development is that of synthetic mica, which requires only cheap materials and has reached the stage of pilot plant experimentation. If successful, this process will be capable of producing mica crystals of sufficiently large dimensions to compete with the natural product. The average annual export of mica from India is 11,250 tons valued at Rs.21,700,000, most of which represents hard currency.

Need of Power Alcohol

Shortage of petrol was the greatest handicap in the complete nationalisation of the transport services in the Central Provinces of India, said Mr. T. P. Bhalla, Transport Commissioner of the Province, reviewing the position. They required 2,100,000 gallons a year for their whole scheme to materialise. The present quota of the Province was not sufficient to meet the demand, he said. There were a large number of sugar mills in the Province producing lakhs of tons of molasses. The conversion of these into power alcohol could be easily done, and if the Government harnessed their machinery to produce power alcohol the whole transport problem would be solved.

New Aluminium Industry

The seal of approval has been given by Sir J. C. Ghosh, Director-General of Industries and Supply, Government of India, to the projected aluminium industry scheme in the Central Provinces and Berar, India, over which a controversy has been raging. In commending the scheme, Sir J. C. Ghosh said that he had reason to believe that with certain adjustments, the necessary capital, technical man-power and machinery, the Province could be the largest aluminium producing region, not only in India, but in the whole world. So far as raw materials are concerned, India can supply any quantity of bauxite for the production of aluminium, and the industry has a bright future. Under the suggested scheme the factory will have a production capacity of 5000 tons of aluminium a year and the capital is 3.75 crores of rupees. The Provincial Government has invested 1.5 crores in this project. When the Wainganga River project for generating hydro-electric power to the extent of 600,000 kW in the ultimate stages materialises, says the Director-General, it will be possible to manufacture aluminium at much cheaper rates than now.

Fertilisers in 1950

Work on the fertiliser project at Sindri, India, one of the greatest factories yet planned in Asia, has been greatly accelerated since the beginning of this year. The implementation of the project had suffered a setback in 1946 and 1947 owing to a number of difficulties relating to land acquisition, obtaining the necessary structural requirements, etc., but it is now confidently expected that it will be completed and go into production early in 1950. The factory, estimated to cost Rs.17 crores, will have an annual rated capacity of 350,000 tons of ammonium sulphate produced from gypsum by the semi-water gas project. The Chemical Construction Corporation of the U.S.A. is in charge of its designing while the Power Gas Corporation of the United Kingdom is procuring the plant and erecting it.

Salt Advisory Committee

A committee of four, under the chairmanship of Mr. P. A. Narielwela, of Messrs. Tata Sons, Ltd., has been appointed by the Government of India to advise on measures necessary to place the salt industry on a sound footing. The three other members are Dr. K. J. Mondgill, director of scientific and industrial research, Travancore; Rai Bahadur S. C. Das, salt controller of the government; and Mr. D. D. Mithal, director, central waterworks, irrigation and navigation commission. The committee will examine existing methods of salt production in government and privately owned salt works.

A CHEMIST'S BOOKSHELF

The Vitax Handbook. Second edition. 1948. Vitax Fertilisers, Ltd., Ormskirk, and Rotterdam.

A remarkable conception of the service which a fertiliser manufacturer may render to the horticultural users of its products is represented by this second revised version of this book, which has afforded valuable guidance to large numbers of horticulturists. It is remarkable for two things, the balanced view it presents of horticultural needs, with no disproportionate emphasis of the important part played by artificial fertilisers, and the wide field which it covers. In the eyes of the specialist the book may appear to have attempted too much by seeking to provide a compendium of nearly all the essentials of culture, nutrition, pestology and harvesting of a host of vegetables and fruits. Its saving grace is that each of the wide-ranging chapters is authoritative, extremely practical and many are well illustrated.

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Proceedings of 3rd International Electrodeposition Conference. Published by the Electrodepositors Technical Society, 27 Islington High Street, London, N.1, 1948. 4 to., 216 pp., price to non-members £2 10s.

This book is a comprehensive report of the proceedings of the 1947 London conference organised by the Electrodepositors Technical Society at the Hyde Park Hotel, September 17-21, where there was also an exhibition at which principal British firms were represented. The book constitutes a fitting record of a fine piece of work which should place Britain still more firmly on the map in the important and progressive sphere of electrodeposition. The president of the society, and chairman of the organising committee, Dr. S. Wernick, and all concerned with the arduous work of organisation are to be commended for an achievement which must have had to face many difficulties.

Mr. S. Field, the society's first member and president, and virtually its founder, who received the E.T.S. medal "for services to science, education, and industry," looked back over the 21 years of its existence and was impressed by its growth. Its membership had increased to over 1000 and was world wide. The conference was international in scope, and included delegates from U.S.A., France, Holland, Belgium, Brazil, Czechoslovakia, Egypt, Finland, India, Italy, Spain, Switzerland and Sweden. The contingents from France and Holland were particularly strong. Australia was represented by Mr. H. E. Arblaster who read a paper on silver-plating in that country.

The first section, on electrolytic polishing of metals, was introduced by a paper by Dr. P. A. Jacquet, the French researcher who was principal inventor and founder of this comparatively new and valuable development. Others in this section dealt with technical and special applications, and the electropolishing of brass pressings. The next section, on miscellaneous processes, included chemical treatment for zinc surfaces, research organisation in the U.S.A., German electroplating and continental trends, internal stress in copper-plating, and porous chromium coatings. The third and fourth sections had valuable and informative contributions on various processes and the structure of deposits.

* * *

The Identification of Textile Materials. (Handbooks of Textile Technology No. 3.) The Textile Institute, Manchester 3. 5s.

This useful handbook forms a comprehensive summary of the work of the Institute's Committee on the Unification of Testing Methods. There are 14 illustrations and four tables of the properties of different fibres. In a lengthy appendix the chemical properties of manufactured fibres are dealt with and there are descriptions of the available chemical tests. Copies of the tables mounted on boards and suitable for use in the laboratory can be supplied on application to the Textile Institute, 16 St. Mary's Parsonage, Manchester 3, and separate copies of the tables unmounted may also be obtained.

* * *

"Painting as a Pastime," containing reproductions in full colour of Mr. Winston Churchill's paintings in various parts of the world, introduced by his own writings on hobbies and painting, is being produced at the beginning of December by Ernest Benn, Ltd.

Home News Items

Chemical Industry Employment Rises.—A report just issued by the North-East Development Association states that in the chemical industries of the area employment is higher than before the war and may be expected to increase further after a few years.

1949 I.C.E. Examination. — Application forms, returnable by December 1, and particulars of the associate-membership for 1949 may be obtained from the hon. registrar, Institution of Chemical Engineers, 56 Victoria Street, Westminster, London, S.W.1.

Rubber and Industrial Footwear.—Following the removal of all footwear from the rationing scheme, the Board of Trade has announced that various restrictions, which required the presentation of a permit for the supply of industrial footwear, have been revoked.

Plastic Wrappers.—Increasing use of plastic hermetically sealed wrappings is being successfully adopted by the Scottish bacon industry. Immediately the hams emerge from the smoke room, they are sealed in the plastic covers and are not touched again until delivered to the consumer.

An Aluminium Bridge.—The first of its kind in the world, a 110 ft. long aluminium lifting bridge weighing 72 tons, built by Head Wrightson and Co., Thornaby, for the River Wear Commissioners, was transported on barges by river to Middlesbrough. The bridge, which is to span the entrance of a dock at Sunderland, will be shipped to the Wear as deck cargo.

Engineering Products from Belgium.—Most of the 100,000 tons of steel to come from Belgium and Luxemburg during the next three months, under the special arrangement announced by the Treasury as a contribution to easing of trade barriers, will be of highly finished products, for use in the engineering industry. The new importation, it is stated, will not affect the South Wales tinplate industry.

Dollar Earner.—It is claimed that half a million dollars will be earned for the country in 1949 by the development of a new type of bituminous anti-corrosive enamel by Wailes Dove Bitumastic, Ltd., Hebburn-on-Tyne, for use on pipe lines in the Middle East. The firm is spending £50,000 on extensions to be completed by the end of this year to cope with the new development, and they will increase output by 50 per cent. Exports, 60 per cent. of which are to the colonies, will be raised by a further 100 per cent.

Tyre Prices Increased.—Rises in tyre prices from 7½ to 10 per cent came into force on September 1, mainly because of the cost of Egyptian cotton, which is still 50 per cent more than six months ago. Tubes of all kinds and bicycle tyres are not affected.

New Jet Research Station at Burnley?—The Ministry of Supply is planning to establish factory buildings at Burnley for research and development of jet propulsion. Application has been made to the local council for purchse of land for that purpose.

Coal Output Up.—An increase in British coal production for the first time in nine weeks, marked the end of the holiday season. Output for the week ending September 4 totalled 4,054,000 tons, less than 4,000 tons behind the weekly average required to reach the 211 m. tons set for this year.

Cement Exports.—The overseas demand for British cement is far in excess of present manufacturing capacity, and it is likely that a scheme designed to make more cement available for export will be announced in the near future. At the moment only between one-third and one-half of the calls made for cement can be met.

Aid from the Dollar Countries.—Great Britain's total receipts under the European Recovery Programme had risen to just over $200 million by the end of August, according to figures released in London last week. Nearly three-quarters of the total, $141,507,000, was spent in Canada, while commodities produced in the United States accounted for $27,036,000.

Industrial Production.—The provisional index published by the Central Statistical Office for June is for industrial production as a whole; revision has caused a slight downward adjustment of the general index. Figures for the chemicals and allied trades are given as: 1947 (monthly average) 105; 3rd quarter 105; 4th quarter 117. 1948, 1st quarter (average), 121; 2nd quarter (average) 117. (Average 1946 = 100.)

Petrocarbon Strike Ends.—Following a meeting in Manchester between representatives of Petrocarbon, Ltd., and trade union officials, a joint statement was issued instructing the 600 building workers on strike at the company's refinery plant at Carrington, Cheshire, to return to work on Thursday last week. The strike began on the Wednesday of the previous week following the dismissal of a shop steward. The statement said that it had been agreed that the dismissed employee should be re-employed as a rigger.

Technical Publications

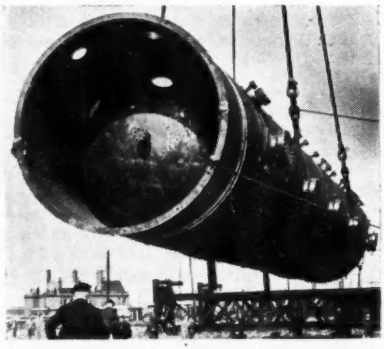
RECENTLY prepared and issued by Price, Stutfield & Co., Ltd., 110 Fenchurch Street, London, E.C.3, in collaboration with Koch & Reis, S.A., Antwerp, is a 28-page booklet on "Sulphur and Special Products for Plants." This contains a good deal of matter of technical interest, covering a wide range of products, with descriptions of their composition and application. There are, as well, chapters dealing comprehensively with such subjects as "The Use of Sulphur as a Fertiliser," "Sulphur as a Plant Tonic," and "Sulphur as a Phytopharmaceutical Product."

* * *

A wall chart giving the characteristics and physical constants of the many surface-coating resins produced by Erinoid, Ltd., of Stroud, in association with A. Boake Roberts & Co., Ltd., and sold only by them, is being distributed by the latter company to users in the paint and associated industries. This chart presents in respect of more than 70 resin products essential data of colour, clarity, acid value, melting range, maximum ash percentage and solubility in oils and in spirits.

* * *

The Chemical Division of the Koppers Company, Inc., has made available a recently issued technical bulletin describing the properties, uses, and chemical reactions of Di-tert-butyl-meta-cresol. This alkylated tar acid is of interest to members of the rubber, synthetic resin, perfume, fat and soap, and petroleum industries. A high-boiling solid phenolic compound, it is soluble in the common organic solvents, but is essentially insoluble in aqueous alkaline solutions. DBMC is used in production of sulphide derivatives which are effective reclaiming agents for synthetic rubber; in the compounding of rubber; in resins and plasticisers; and in the production of certain perfume intermediates. The bulletin includes technical information about the properties of the compound, and a discussion of its uses and chemical reactions



Unloading at Victoria Dock, London, a 153-ton, 71 ft. 6 in. de-asphalting tower made by the M. W. Kellogg Company, of New York. Originally destined for Anglo-Iranian at Haifa, the tower, of 2⅞ in. plates and 13 ft. 5 in. in diameter, will now be incorporated in a U.K. refinery's equipment

* * *

Three new types of dry-concentrating developed by the U.S. Bureau of Mines for separating ores not amendable to ordinary ore-dressing treatment are described in Report of Investigations 4286. The new equipment is designed to separate ores primarily on the basis of their shape and size rather than their specific gravity or weight. In describing the structure and operation of each of the concentrating machines, the publication points out that they have been successfully employed on an experimental scale in the separation of such minerals as vermiculite, graphite, molybdenum, kyanite, and chromite. Results of the experimental studies, as well as photographs and mechanical drawings of the new equipment, are obtainable free from the Publications Section, 4800 Forbes Street, Pittsburgh 13, Pa.

* * *

The Lead Industries Association, 420 Lexington Avenue, New York, 17, has published a booklet, "A Medical View of the Lead Problem," which contains reprints of papers on important aspects of health safeguards in the lead industry. The responsibilities of the employer, employee and the general public are outlined, and a series of ten conclusions, resulting from prolonged investigation, are presented. Among a number of interesting articles are two by an industrial hygienist giving his view on the medical and engineering problems associated with the prevention of lead intoxication. Copies are obtainable from the association, price 50c.

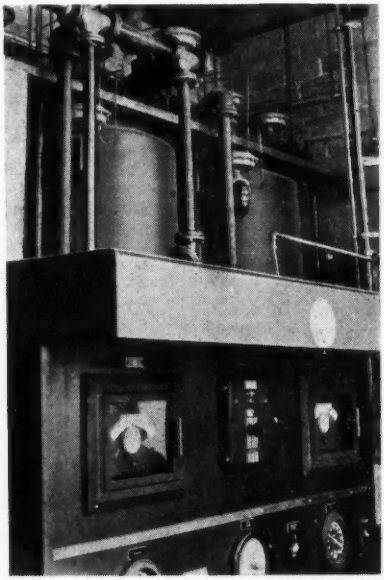
Efficient Water Treatment

Economical Automatic System

USING a specially designed demineraliser employing the ion exchange principle, the J. T. Baker Chemical Company, Phillipsburg, New Jersey, is stated to have reduced the cost of producing mineral-free water from approximately $5.000 to $0.265 per 1000 gallons. Since the treated water is used in the manufacture of virtually all of the company's analytical reagent chemicals and acids, the specifications set for the water are stringent: a total ionised solids content of not more than four parts per million. The raw water available at the plant contains a total of 151 p.p.m., 17 of which are silica. The rate required was 6700 gal. per hour.

The equipment used (installed by the American Cyanamid Co.), a multi-bed system, is interesting for the full use it makes of the automatic control principle. Air-operated diaphragm valves are automatically operated from a central control panel; an alarm sounds when the treated water falls below the specified standard and a conductivity controller affords an additional check; solenoid valves automatically shut down the entire system when storage tanks are full and divert any sub-standard water when operations are resumed.

The operating costs of $0.265 per 1000 gal., include the water charges.



Convenient layout of "Filt-R-Still" showing closely adjacent mechanism and control panel

PERSONAL

AT the invitation of the Insecticides Committee appointed by the Colonial Office, MR. L. W. LEYLAND COLE, 45 year-old chief agricultural chemist for the Shell Petroleum Co., Ltd., in London, and formerly for 15 years senior lecturer in agricultural chemistry at Wye College, London University, is leaving next week for East Africa. He will visit Kenya, Uganda, Tanganyika and the Sudan to study the problem of devising new means for combating tsetse flies, mosquitoes and other insects which have prevented the cultivation of large tracts of colonial territories. He will use fixed wing and helicopter aircraft for "fog-spraying" infested areas with oil-base solutions and synthetic chemicals.

MR. H. CONSTANT has been appointed Director of the Ministry of Supply's National Gas Turbine Establishment in succession to DR. ROXBEE COX, who is to take up an appointment with the Ministry of Fuel and Power. Mr. Constant, a deputy director of the National Gas Turbine Establishment, which is concerned with research and experimental work for military and civil purposes, took up his new appointment last week.

NEXT WEEK'S EVENTS

WEDNESDAY, SEPTEMBER 8 to WEDNESDAY, SEPTEMBER 15

British Association for the Advancement of Science. Brighton. 110th Annual meeting.

FRIDAY, SEPTEMBER 17 and SATURDAY, SEPTEMBER 18

Society of Leather Trades' Chemists. Large Chemistry Lecture Theatre, University, Leeds, 9.30 a.m. Annual general meeting and conference. Friday, 2.0 p.m. G. S. Adair: "Recent Work on Osmotic Pressures, Membrane Equilibria and Solubility Factors of Protein in the Light of the Work of Procter." (Third Procter Memorial Lecture.)

SATURDAY, SEPTEMBER 18 and SUNDAY, SEPTEMBER 19

Aslib. Ashorne Hill, near Leamington Spa, Warwickshire, 10.0 a.m. 23rd Annual conference.

SATURDAY, SEPTEMBER 11, to SUNDAY, SEPTEMBER 19

Société de Chimie Industrielle, of Paris. Brussels. 21st International Congress of the Chemical Industry

Overseas News Items

Mexican Oil Payment Confirmed.—President Miguel Aleman, of Mexico, has confirmed that the first instalment of compensation for the expropriation of British oil properties in Mexico will be paid on September 18.

U.S. Petroleum Price Drop.—Slackened demand, stock accumulations, the continued high rate of U.S. refining operations and a generally more optimistic supply outlook, have been listed as reasons for the falling prices of petroleum on the Gulf open market.

Norway's Only Refinery To Be Rebuilt.—The only refinery in Norway, situated at Vallee in the southern part of the country, which was totally destroyed during the war, is to be rebuilt as soon as possible. Its capacity will be the same as before, 30,000 long tons of crude oil.

U.S. Magnesite and Magnesia.—Output of crude magnesite in the U.S.A. in 1947 totalled 375,993 short tons, according to reports of producers to the Bureau of Mines. This production was more than double the 1937-39. Caustic-calcined magnesia decreased 27 per cent from 1946 whereas refractory magnesia established a new peak of 314,921 short tons, 4 per cent more than the previous record made in 1943.

Australian Petrol Cuts.—The Prime Minister, Mr. Chifley, has announced petrol cuts of 20 per cent for private motorists and 10 per cent for other users as from October "to conserve petrol for defence." Mr. Chifley, said stocks were down to 60 per cent of pre-war. Not only the dollar but the world supply position was becoming "increasingly difficult." The Cabinet had also decided to conserve aviation petrol in civilian use and to build up stocks for both naval and civil purposes.

S. American Plastics.—A plant for the manufacture of plastic articles for domestic and industrial uses will shortly be completed in S. Paulo by De La Rue Plásticos, S.A., an Anglo-Brazilian "mixed" company, affiliated with the British De La Rue undertaking. The installation of the factory, the largest of its kind in South America, was begun in 1945; presses and other equipment have been shipped from Great Britain and operations will be under the technical supervision of experts from the parent company. It is understood that insulators and other electrical fittings, telephone sets, wireless cabinets, dashboard panels, cameras, combs, trays, etc., will be among the articles to be produced.

U.S. Oil Supply Estimates.—Leading economists of the United States on industry estimate that oil supplies in the United States will be sufficient to meet the record consumer demands next winter and in the first quarter of 1949.

New Furnace for Ferro-Alloys in S.A.—In their annual report, the African Metals Corporation announce the intention to construct another furnace for ferro-alloys on a new site near Meyerton, Transvaal, to which the company's furnaces at Vereeniging will be gradually transferred.

Atomic Energy Control in South Africa.—The South African Senate has passed a Bill giving the State complete monopoly and control of the exploitation and treatment of radio-active materials and the generation of atomic energy, and providing for the establishment of an atomic energy board.

U.S. Native Sulphur Production.—Production of native sulphur in the United States in June, 1948, continued at a very high rate, according to reports of producers to the U.S. Bureau of Mines. During the first six months of 1948 more sulphur (2,394,509 long tons) was produced than in any similar previous period. Sales were also at a record level and stocks declined by 67,050 tons to a total of 3,303,984 tons.

Chilean Copper Decree.—The Chilean Ministry of the Treasury has issued a decree authorising the sale of Chilean copper products to countries unable to pay in dollars, according to a report from New York. The decree, it is stated, allows for the export of copper products in semi-finished or finished form and includes products in which copper alloys are used. It is believed the measure will favour especially Argentine, Spain, Italy and France, as these countries may pay in their own currencies under conditions, the despatch added.

Canadian Titanium Discovery.—A huge deposit of titanium, which, it is claimed, may prove to be the world's largest, has been discovered in Eastern Quebec. First announcement of the find was made by Premier Maurice Duplessis, of Quebec, who disclosed plans for a $25 million project to develop the deposit. A Federal Government spokesman said the discovery would have a tremendous influence on Canada's mining future, and put it in the same class "as the discovery of gold." The ore, discovered near Lake Allard, 400 miles north east of Quebec City, is refined into a metal for high-grade alloys and pigments for paints.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

JENCONS (SCIENTIFIC), LTD., London, E.C. (M., 11/9/48.) August 5. debenture to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *Nil. January 13, 1948.

Company News

The British Malayan Tin Syndicate proposes to increase its capital from £50,000 to £110,000.

The directors of **Boots Pure Drug Company, Ltd.,** have declared an interim dividend of 10 per cent, less tax, for the half-year ending September 30, 1948.

The directors of **The Distillers' Co., Ltd.,** recommend the payment of a final dividend on the ordinary stock of 3 3/5d. per 4s. unit, less income tax, for the year ended March 31, which, if approved, will be paid on October 26. The seventy-first annual general meeting of the company is to be held on September 24.

At the twenty-eighth annual general meeting of **British Glues & Chemicals, Ltd.,** it was reported that the consolidated profit and loss account showed a consolidated profit for the year amounting to £113,606 after the charges shown in the account and after providing for all taxation. The corresponding figure for last year was £104 514. The net dividends authorised by the directors amount to £28,875 on the preference stock and £24,062 on ordinary stock, leaving £41,812 to be carried forward in the balance sheet.

Chemical and Allied Stocks and Shares

ALTHOUGH slightly more active, industrial shares have been characterised by small irregular movements, the tendency having been to follow proceedings at the TUC for any indications of Government policy. It is now admitted that the dividend limitation request has been loyally followed by all important industrial companies, and no legislation for limiting profits and dividends is expected. It is clear, however, that the new production drive may have repercussions on many classes of companies whose business is entirely in the home market. British Funds have been in renewed demand, 3 per cent Transport stock touching the new high level of 99 1/16.

Imperial Chemical eased to 44s. 6d. and the new shares were also easier at 3s. 1½d. premium, the latter being sold by those not wishing to take up their "rights," the last day for which is September 14, when the first call of 20s. is payable. After that date the new shares are expected to attract increased demand because they are a cheaper purchase than the old shares, and the directors have stated that they anticipate being able to maintain the 10 per cent dividend total in future on the increased capital. The final call on the new shares is 20s. 6d. (the issue price being 40s. 6d.) and is not due until October 28.

Fisons have changed hands up to the higher level of 59s., Laporte Chemicals 5s. units were 20s. 6d., Amber Chemical 2s. shares 9s. 6d. and Albright & Wilson 5s. shares 28s. 7½d. Greeff-Chemicals Holdings 5s. shares were around 14s. 6d. Moreover, William Blythe 3s. shares held their rise to 18s. 9d., and Blythe Colour 4s. units were firm at 60s. In other directions, Erinoid 5s. ordinary have been more active around 11s., reflecting hopes that the dividend may be maintained. Glaxo Laboratories changed hands around the higher level of £18, Burt Boulton were 26s. 3d. and Ilford 5s. ordinary more active around 26s. Elsewhere, A. Boake Roberts improved to 30s.

British Aluminium at 47s. 6d. have been firm with British Oxygen 99s. 4½d., Borax Consolidated 59s. and Amalgamated Metal (19s. 3d.) were slightly higher on balance. Firmness was shown by Turner & Newall (77s. 6d.) and United Molasses (48s. 6d.) while in response to the strength of the consolidated accounts, the units of the Distillers Co. firmed up to 27s. 3d. British Plaster Board 5s. ordinary were 25s. 3d. Goodlass Wall 10s. ordinary 36s., Pinchin Johnson 5s. 6d. and International Paint in their new form of 4s. units have changed hands around 31s. 9d. Coalite & Chemical 2s. ordinary strengthened to 4s. 1½d.

Colliery shares were good on latest marked estimates of "break-up" values, with Staveley advancing strongly to 80s. 6d. on the full results and chairman's annual statement. In particular, the market is still hopeful that the proposed capital return by Doncaster Amalgamated Collieries (in which Staveley has a large interest) may mean a

special payment in future for Staveley shareholders. Iron and steel shares were also better where changed, Stewarts and Lloyds being 55s. 4½d., Colvilles 33s. 9d. and Dorman Long 30s. 9d. Moreover, still helped by the strength of the balance-sheet, and the chairman's annual review, Guest Keen rose afresh to 49s. 3d. Ruston & Hornsby moved up to 54s. 9d.

Boots Drug, were 52s. 9d., reflecting the easier tendency in shares of companies with important retail interests—in evidence since the T.U.C. request for further price cuts. Beechams deferred were better at 20s. and Griffiths Hughes have risen to 36s. 3d. Oil shares were easier inclined, Shell being 78s. 1½d. and Anglo-Iranian £8¼.

British Chemical Prices

Market Reports

PRESSURE for supplies has been reported from practically all sections of the industrial chemicals market and contract deliveries are being taken up to the fullest extent. Buying for export has been on a good scale and a fair number of inquiries for shipment remain in circulation. The soda products are in steady request, particularly the alkalis and a tight supply position continues for most of the potash compounds. The coal-tar products market is unchanged.

MANCHESTER.—With the approaching end of the holiday season, trading conditions on the Manchester chemical market during the week have been less under the influence of seasonal factors and reports generally point to a steady flow of inquiries from home consumers, covering a wide range of both light and heavy materials. Existing orders are being drawn against satisfactorily and replacement buying has been on a fair scale. The general run of alkali products, as well as the potash, ammonia and magnesia chemicals, are wanted in good quantities by domestic users, while shippers are maintaining interest on export account. Most of the tar products are also meeting with a brisk demand.

GLASGOW.—Business during the week in the Scottish chemical market has been fairly well maintained, and the volume of orders received covered a varied range of chemicals. Prices also have remained fairly steady. The export market is still very active, and numerous inquiries have been received and a considerable amount of business has resulted. An increase in the number of offers from continental suppliers has also been noted.

AMERICAN METALLURGY

A NEW educational manual entitled "Copper-base Casting Alloys" has been published by Federated Metals, division of American Smelting & Refining Company, 120 Broadway, New York 5. The illustrated 52-page book deals extensively with the practical application of copper-base metallurgy. It also includes a compilation of standard industry specification tables and covered in the text are thermal effects, shrinkage, porosity, gas porosity, and various behaviour characteristics of high copper alloys, tin bronzes and red brasses, nickel silver, aluminium bronze, silicon bronze and silicon brass.

The results of two series of co-operative industrial tests designed to establish the value of electrolytic manganese in steelmaking are described in a publication by the Bureau of Mines, R.I.4303. Most of the tests were made in an experimental open hearth furnace. Comparative results of the steel qualities of various heats and other technical data are included in the Bureau report, a free copy of which may be obtained from 4800 Forbes Street, Pittsburgh 13, Pa.

Purchase Tax on Soap Substitutes.—The Commissioners of Customs and Excise have drawn the attention of registered traders to the fact that shampoos are chargeable with purchase tax at the rate of 33⅓ per cent of the wholesale value. This charge is regarded as applying to soap substitutes, liquid, solid or paste, which are put up with any implication that they are intended for use as shampoos, whether or not they are claimed to be "bases" or concentrates requiring further preparations before use as shampoos. Soap substitutes which are put up with no claims or statements as to use for toilet purposes or which are put up specifically and exclusively as household cleansers are not chargeable with tax.

Manchester Oil and Colour Chemists.—The Manchester Section of the Oil and Colour Chemists' Association has arranged for Friday afternoon, September 24, a visit to the seed crushing and oil refining works of J. Bibby & Sons, Ltd., at Great Howard Street, Liverpool 3. In the evening, the section will hold a meeting of members in the Lecture Theatre, Chemistry Building, Liverpool University, at which a paper is to be read by Professor Hilditch entitled "Current Work at the University of Liverpool on Potential Sources of Drying Oils." The annual dinner and dance of the Manchester Section is to be held on October 29 at the Grand Hotel, Aytoun Street, Manchester 1.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2, at 1s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Manufacture and purification of cellulose esters of higher fatty acids.—J. J. Allen, and J. A. Hawkes. Jan. 23, 1946. 605,912.

Manufacture of substituted benzhydryl ethers.—E. P. Newton (Parke, Davis, & Co.). Jan. 29, 1946. 605,915.

Manufacture of substituted benzhydryl ethers.—E. P. Newton, (Parke, Davis, & Co.). Jan. 29, 1946. 605,916.

Manufacture of substituted benzhydryl ethers.—E. P. Newton, (Parke, Davis, & Co.). Jan. 29, 1946. 606,158.

Stable dispersions of secondary aromatic aminies.—E. I. Du Pont De Nemours & Co., and B. M. Sturgis. Feb. 1, 1946, 605,918.

Process for the production of coumarins. —Ward, Blenkinsop & Co., Ltd., and H. G. Dickenson. Feb. 7, 1946. 605,999.

Production of furfuryl alcohol.—Imperial Chemical Industries, Ltd., F. Starkey, and J. G. M. Bremner. Feb. 26, 1946. 605,922.

Process for the manufacture of halogenated naphthoquinoneimides.—P. May, (Sandoz, Ltd.). March 11, 1946. 606,088.

Trimeric alpha methyl para methyl styrene and method of making the same.—Standard Telephones & Cables, Ltd. June 4, 1945. 606,085.

Heat-exchangers.—Power Jets (Research and Development) Ltd., and R. D. Van Millingen. March 17, 1946. 606,086.

Insect-repellents or insecticides.—C. V. Chemische Fabriek Rids. Sept. 7, 1942. 606,087.

Manufacture of interpolymers of styrene with polyhydric alcoholic mixed esters and of coating compositions obtained therefrom. —L. Berger & Sons, Ltd., Petrocarbon, Ltd., L. E. Wakeford, D. H. Hewitt, F. Armitage, and H. Steiner. Sept. 2, 1946. (Addition to 573,,809.). 605,929

Injection moulding of resinous compositions.—British Resin Products, Ltd. Feb. 8, 1945. 606,259.

Di-substituted hexane.—Lederle Laboratories, Inc. April 1, 1944. 606,261.

Collagenous strands, and method of making the same.—American Cyanamid Co. March 20, 1944. 606,427.

Substituted diamines.—Soc. Des Usines Chimiques Rhone-Poulenc. June 22, 1943. 606,181.

Preparation of substituted diamines.—Soc. Des Usines Chimiques Rhone-Poulenc. Jan. 19, 1944. 606,182.

Substituted diamines.—Soc. Des Usines Chimiques Rhone-Poulenc. Sept. 19, 1943, 605,187.

Solid hypochlorite-containing compositions.—W. H. Langwell. Aug. 20, 1945. 606,431.

Derivatives of propanoic acid and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,188.

Thiophene compounds, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,189.

Thiophene compounds, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,190.

Thiophene compounds, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,191.

Thiophene compounds, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,192.

Thiophene compounds, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,193.

Thiophene compounds, and processes of preparing the same.—Merck & Co., Inc. Sept. 16. 606,194.

Thiophene compounds, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,195.

Biotin, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,196.

Propanoic acid derivatives and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,197.

Thiophene compounds, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,198.

Biotin, and processes of preparing the same.—Merck & Co., Inc. Sept. 16, 1944. 606,200.

Platinum group metal catalysts.—American Platinum Works. Feb. 2, 1942. 606,348.

Production of polymers and copolymers comprising trifluoroethylene.—E. I. Du Pont De Nemours & Co. Sept. 19, 1944. 606,273.

Manufacture of complex granulated fertilisers.—Soc. Anon Des Manufactures Des Glaces Et Produits Chimiques De St.-Gobain, Chauny, & Cirey. Oct. 18, 1944. 606,442.

Water carbonating devices.—Coca-Cola Co. Jan. 15, 1942. 606,531.

Diesel engine fuels.—R. T. Pollock. Jan. 20, 1945. 606.212.

Insecticidal compositions.—Westinghouse Electric International Co. Jan. 11, 1945. 606,218.

The Good Earth

From its deepest depths to fertile surface, the good earth provides the raw material converted by the science of man to man's needs.

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Concentration of organic substances.—Distillation Products, Inc. Feb. 23, 1945. 606,230.

Treatment of the surfaces of articles made of aluminium or its alloys.—Compagnie De Produits Chimiques Et Electrometallurgiques Alais, Froges, & Camargue. Feb. 10, 1945. 606,240.

Treatment of the surfaces of articles made of aluminium or its alloys.—Compagnie De Produits Chimiques Et Electrometallurgiques Alais, Froges, & Camargue. Feb. 10, 1945. 606,241.

Preparation of organo-silicon polymers.—C. Shaw, W. E. Smith, and H. G. Emblem. Jan. 11, 1946. 606,301.

Method of obtaining fat or oil, and feeding meal from fish, fish offal and the like.—Aktieselskabet Stord, and O. Notevarp. Jan. 26, 1942. 606,304.

Polymerisation of vinylbiphenyl.—General Aniline & Film Corporation. Dec. 30, 1944. 606,364.

Process for the surface protection of metals.—Walterisation Co., Ltd., and W. I. Walters. Jan. 14, 1946. 606,381.

Manufacture of moulded resins.—Lonza Electric & Chemical Works, Ltd. Jan. 15, 1945. 606,384.

Production of magnesium base die casting alloys.—Bendix Aviation Corporation. Jan. 31, 1945. 606,399.

Heating and reheating of ferrous metals.—J. Miles & Partners (London), Ltd. and A. G. E. Robiette. Jan. 14, 1946. 606,401.

Esters, and process for making them.—Carbide & Carbon Chemicals Corporation. Feb. 6, 1945. 606,407.

Production of sodium bicarbonate, and ammonium chloride.—W. Reinders. Jan. 14, 1942. 606,456.

Method for the production of esters of dioles and trioles of cyclopentane-polyhydrophenanthrene series.—Lovens Kemiske Fabrik ved. A. Kongsted. Jan. 29, 1942. 606,480.

Purification of penicillin salts.—Glaxo Laboratories, Ltd., E. L. Smith, and A. E. Bide. Jan. 28, 1946. 606,482.

Manufacture of substituted benzhydryl ethers.—E. P. Newton (Parke, Davis & Co.). Jan. 29, 1946. 606,317.

Production of carbon monoxide.—Imperial Chemical Industries, Ltd., G. Nonhebel, and M. H. M. Arnold. Feb. 15, 1946. 606,321.

Ferrous metal articles coated with aluminium or aluminium-base alloy.—H. W. K. Jennings (Al-Fin Corporation). July 5, 1944. 606,330.

Production of magnesium, and apparatus therefor.—Honorary Advisory Council for Scientific and Industrial Research. Dec. 18, 1941. 606,637.

Apparatus for the recovery of volatilisible metals.—Honorary Advisory Council for Scientific and Industrial Research. Dec. 18, 1941. 606,638.

Apparatus for the recovery of volatilisible metals.—Honorary Advisory Council for Scientific and Industrial Research. Dec. 18, 1941. 606,639.

Direct production of ductile magnesium.—Honorary Advisory Council for Scientific and Industrial Research. Jan. 13, 1942. 606,640.

Method and apparatus for producing magnesium.—Honorary Advisory Council for Scientific and Industrial Research. Feb. 5, 1942. 606,641.

Apparatus for producing magnesium by thermal reduction.—Honorary Advisory Council for Scientific and Industrial Research. Feb. 21, 1942. 606,642.

Vacuum apparatus for producing magnesium.—Honorary Advisory Council for Scientific and Industrial Research. March 9, 1942. 606,643.

Apparatus for producing magnesium.—Honorary Advisory Council for Scientific and Industrial Research. April 30, 1942. 606,644.

Methods for the oxidation of saturated aliphatic hydrocarbon gases.—Clark Bros. Co., Inc. Oct. 24, 1942. 606,554.

Separation of narrow boiling hydrocarbon fractions.—Anglo-Iranian Oil Co., Ltd., S. F. Birch, J. Habeshaw, and C. B. Collis. Dec. 5, 1944. 606,797.

Production of pure hydrocarbons from petroleum naphtha, and other hydrocarbon feedstocks.—Anglo-Iranian Oil Co., Ltd., S. F. Birch, J. Habeshaw, and R. A. Lowry. Dec. 30, 1944. 606,798.

Production of hydrocarbons from petroleum naphtha.—Anglo-Iranian Oil Co., Ltd., S. F. Birch, R. A. Lowry, and C. B. Collis. Jan. 2, 1945. 606,799.

Preparation in a condition of purity of benzene and/or cyclohexane from mixtures containing them.—Anglo-Iranian Oil Co., Ltd., S. F. Birch, J. Habeshaw, and C. B. Collins. Jan. 12, 1945. 606,800.

Production of resins from phenolic mixtures.—Entreprises A. Cochery. April 9, 1942. 606,661.

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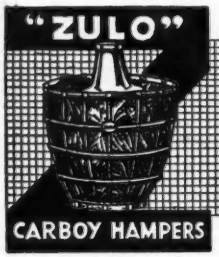

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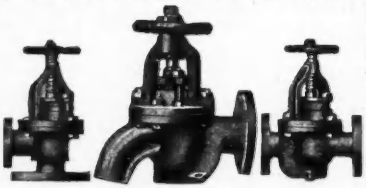
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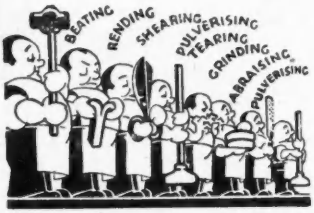

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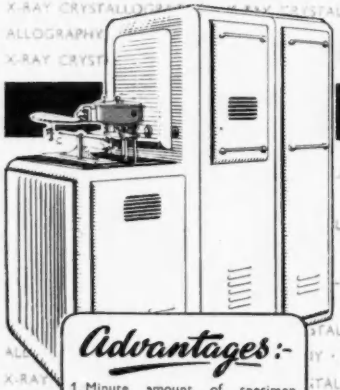

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